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No.

AUGUST 26, 1933

Railway Age

Founded In 1856

Another Opportunity Without the Former Handicaps

THE railway industry today is, in at least two important respects, in a much more favorable position than it was in the recovery period following the post-war depression.

Then, the railroads were forced to make a general reduction in freight rates, whereas the Interstate Commerce Commission recently refused to make such a reduction.

Then, there was a shopmen's strike, which is not a problem in this period of recovery.

And yet, despite those handicaps, railway purchases following the post-war depression were the greatest in the history of the industry and the vast sum of money thus spent for "durable goods" was one of the most important factors which brought the country back to prosperity.

BETTER EARNINGS

Even without increasing traffic, better railroad earnings would result from additional savings made in the total cost of operation.

Where can savings be made?

The cost of locomotive operation — which accounts for about one-third of the railroad's total operating cost — offers the greatest single opportunity for substantial savings.

Because

Only about *one-fourth* of the motive power in daily operation is composed of modern locomotives capable of hauling heavy tonnage at high speeds and at a minimum cost per ton-mile.

Therefore

Every additional modern locomotive replacing one or more that are obsolete, means a saving in the cost of operation — resulting in better earnings.

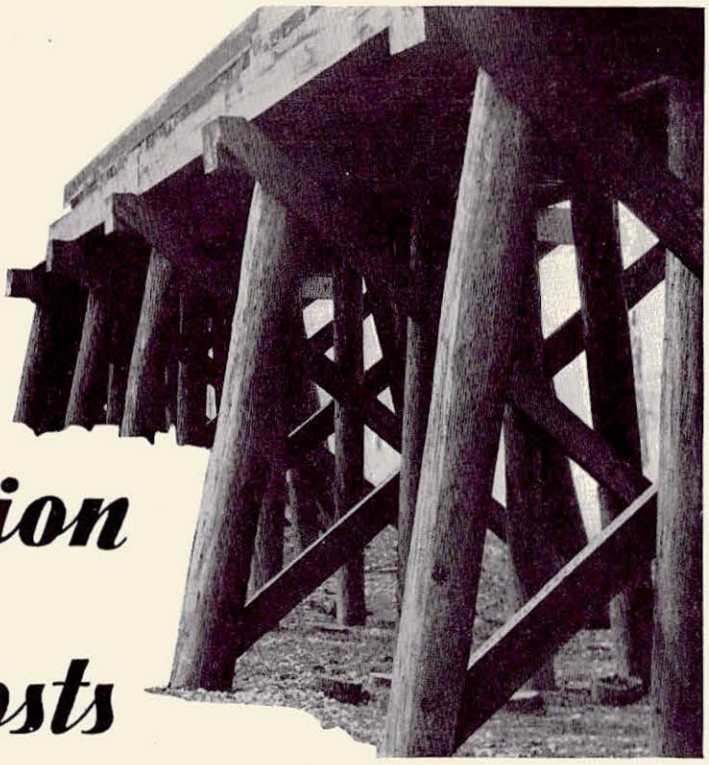
It takes Modern Locomotives to make money these days!

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA

Published weekly by Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter, January 4, 1933, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879.

How AMCRECO PRODUCTS cut construction and maintenance costs



Courtesy K. C. S. Ry.

4. Creosoted bridge timber reduces fire hazard*

Creosoted timber is not only protected against decay. It also resists fire. It ignites slowly and soon chars on the surface, thereby excluding oxygen and stopping combustion. Fire will ordinarily die out in a creosoted timber before it has materially affected strength. When timber structures are provided with a ballasted deck, protecting against hot coals dropped from locomotives, they are rarely in danger from fire. We will gladly show you how AmCreCo bridge timber can save you money.

Quality is inherent in AmCreCo Products (ties, piles, poles and timber) Because:

1. Only carefully selected timber is used.
2. Woods practice and plant handling protect against incipient decay.
3. Treatment is accurately timed to proper seasoning.
4. Only creosote from pure coke oven or coal gas tar is used.
5. The wood is adequately treated.
6. Framing before treatment is standard practice.
7. The facilities and personnel of the leading producer in the industry are back of every AmCreCo product.

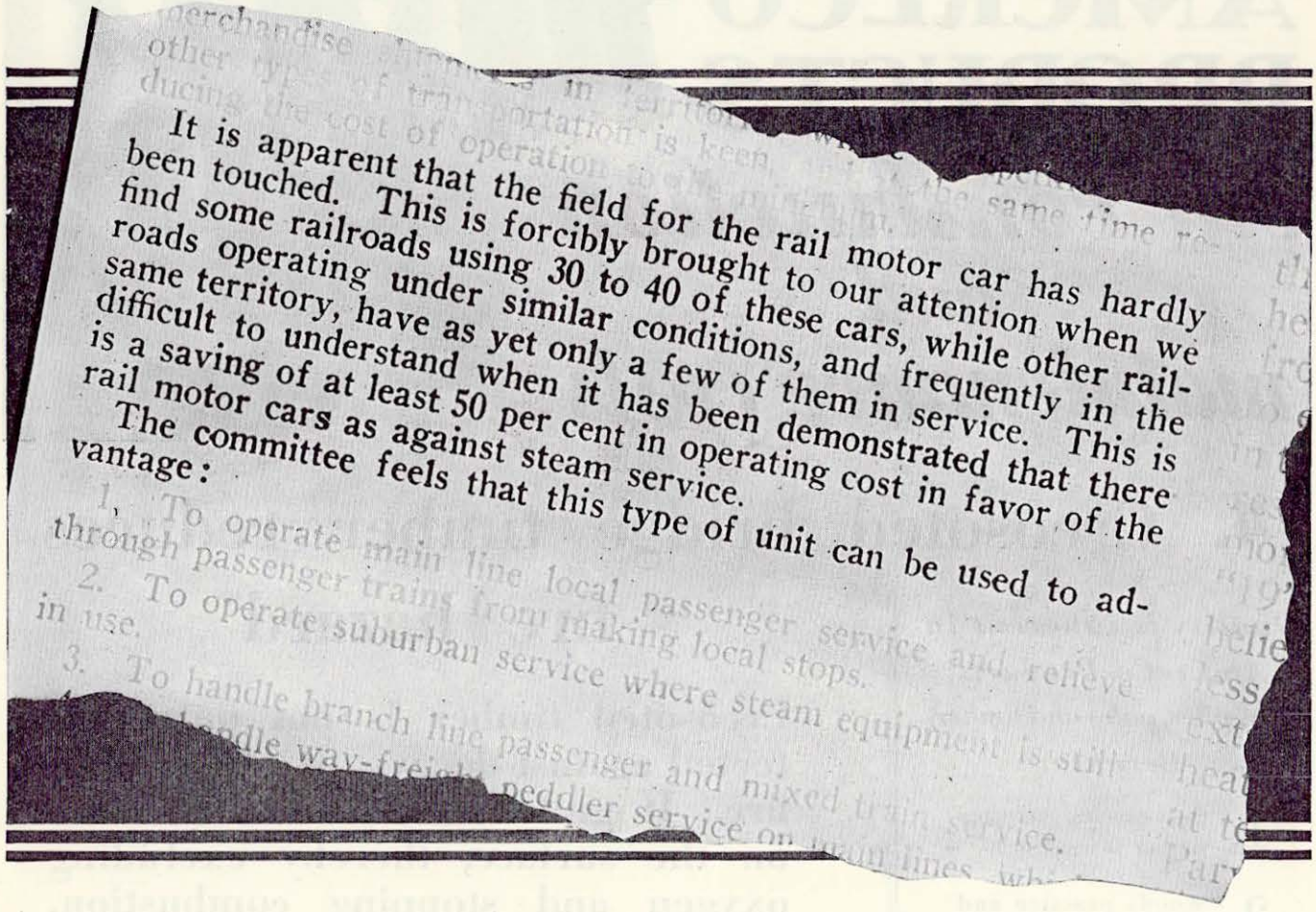
AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED — AMCRECO LOWRY PROCESS CREOSOTED WOOD — GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE — KENTUCKY

**The fourth of a series of discussions, pointing out reasons for the economy produced by AmCreCo products.*

"....there is a saving of at least 50% in operating cost in favor of the rail motor cars as against steam service."


It is apparent that the field for the rail motor car has hardly been touched. This is forcibly brought to our attention when we find some railroads using 30 to 40 of these cars, while other railroads operating under similar conditions, and frequently in the same territory, have as yet only a few of them in service. This is difficult to understand when it has been demonstrated that there is a saving of at least 50 per cent in operating cost in favor of the rail motor cars as against steam service.
The committee feels that this type of unit can be used to advantage:

THIS extract from a committee report* at the recent convention of the American Association of Railroad Superintendents is an indication of what operators think of rail motor cars. General Electric's twenty-eight years' experience with rail motor cars confirms their conclusion.

The installation of rail motor cars is an economic necessity. And, like all worth-while modernization, it will soon pay for itself in reduced operating costs.

There are already in service more than 725 rail motor cars with electric drive. G-E equipment is installed on more than two-thirds of these cars and has proved its dependability. General Electric Company, Schenectady, N. Y.

*Railway Age, June 24

391-55

GENERAL ELECTRIC

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Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

Vol. 95 August 26, 1933 No. 9

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Describes tests of special broaching method which indicate possibility of reducing friction from 50 to 90 per cent.

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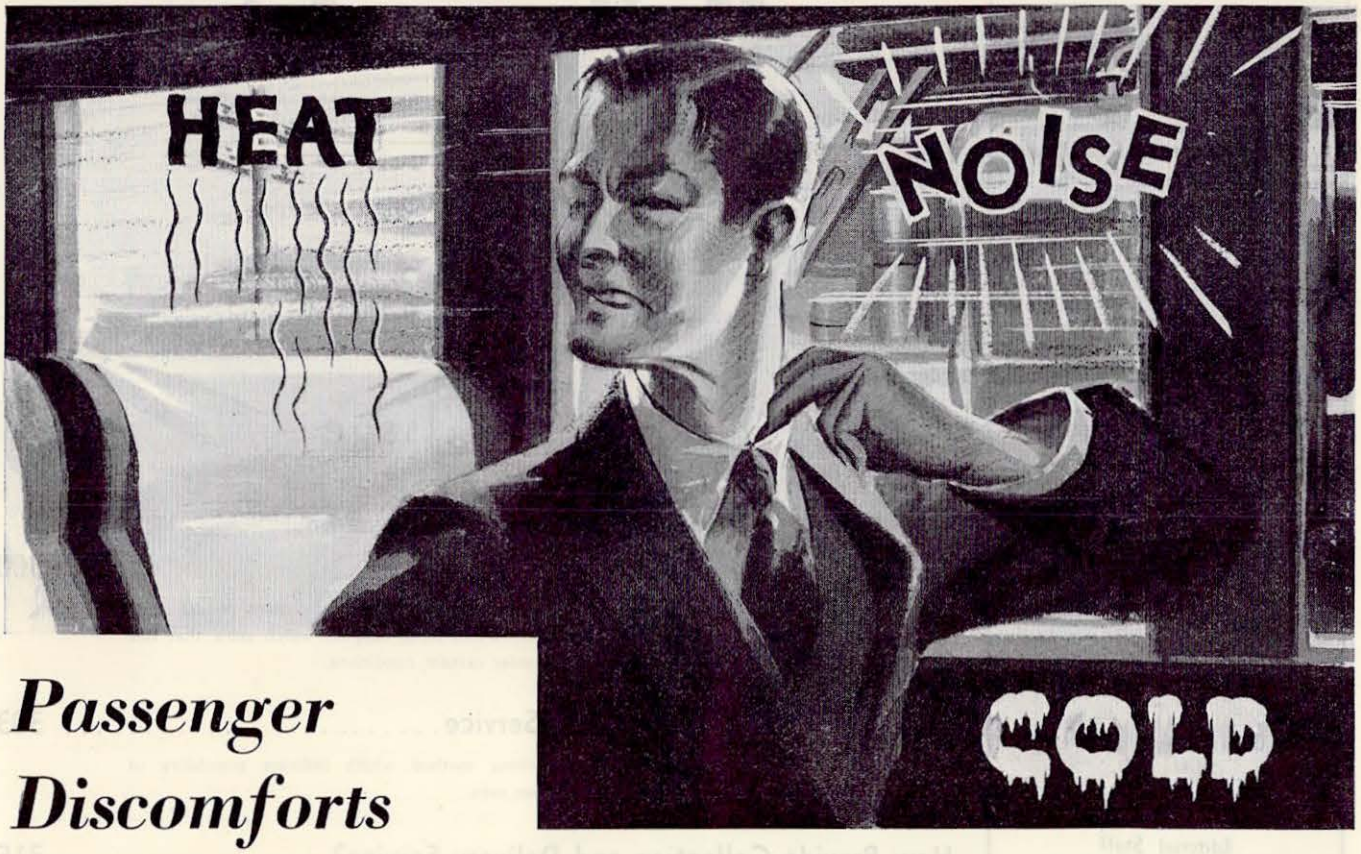


Passenger Discomforts

— Car Insulation must stop all three

Increased passenger traffic has followed the introduction of air-conditioned equipment on every line. This increased patronage is due directly to improved passenger comfort and points the way to a continued increase in comfort facilities.

Car builders have found that the more exacting requirements of controlled temperature necessitate more insulation. And along with the present tendency to save weight wherever possible full consideration should be given to the insulation used.

American Hair & Felt Company and Dry-Zero Corporation are pioneers in this field, having supplied about 87% of all the insulation for American and Canadian railroads. Requirements over a period of many years have been studied intimately and weight saving has always been advocated. These companies are specializing in light weight insulation.

But light weight should not be the sole requirement. In the insulation of passenger cars there are three important functions of the insulating material, none of which should be sacrificed. They are:

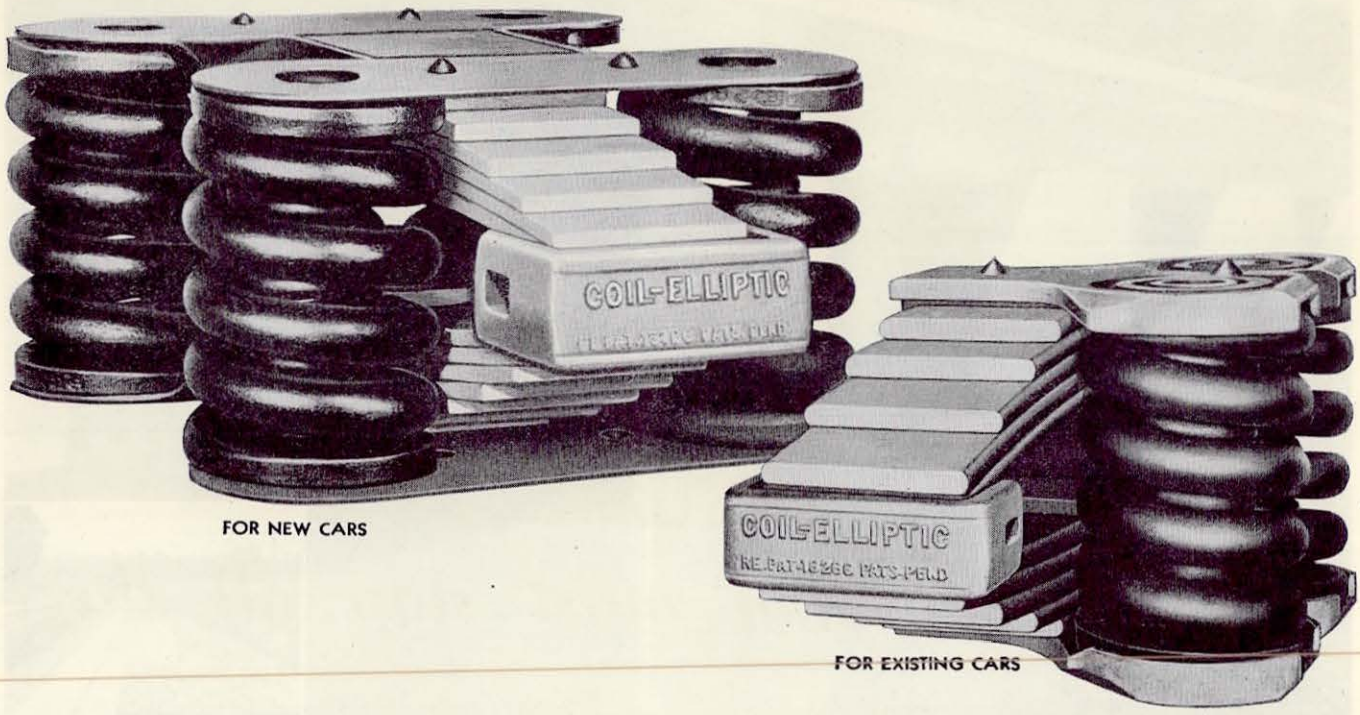
Insulation against heat
Insulation against cold
Insulation against noise

And in securing these three objectives, permanence is as important as efficiency and lightness. No other materials provide such complete and permanent protection from heat, cold and noise, as those supplied under the trade names listed below. The Dry-Zero laboratory in Chicago is second to none in insulation research and testing, and a highly trained engineering staff, recognized by many authorities, has been assisting in the designing of equipment and in the proper use and application of insulating materials. Their services are at your disposal without obligation.

Hairinsul √ Dry-Zero √ Salamander Passenger Car Insulation
Carinsul Passenger Car Insulation √ Ozite Standard Hair Felt

AMERICAN HAIR & FELT COMPANY—DRY-ZERO CORPORATION
Railroad Division
Merchandise Mart **Chicago**

"COIL - ELLIPTIC" SPRING GROUPS Control The Bumps



FOR NEW CARS

FOR EXISTING CARS

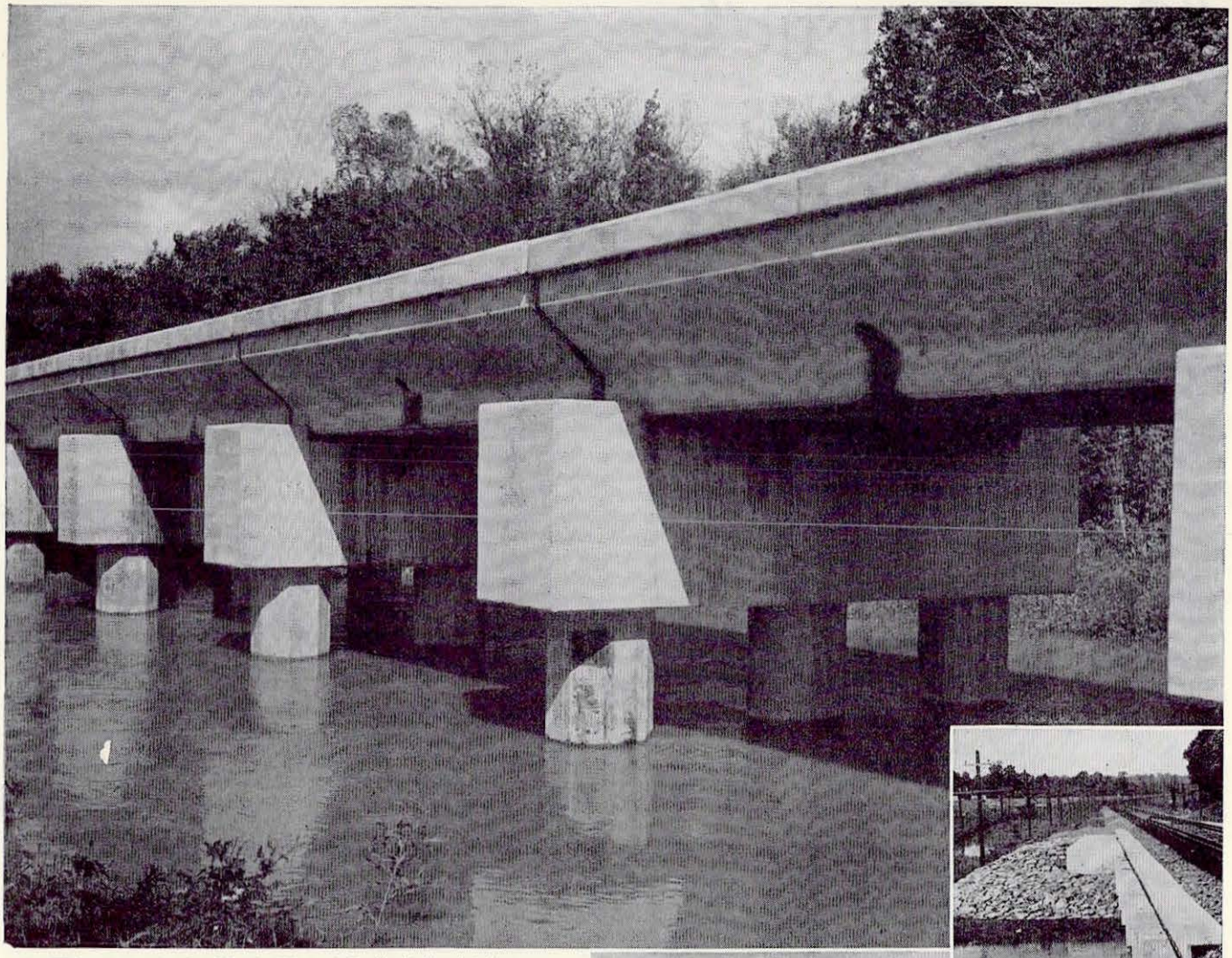
Friction between the leaves of the elliptic springs counteract and soften the violent oscillations of the coil springs.

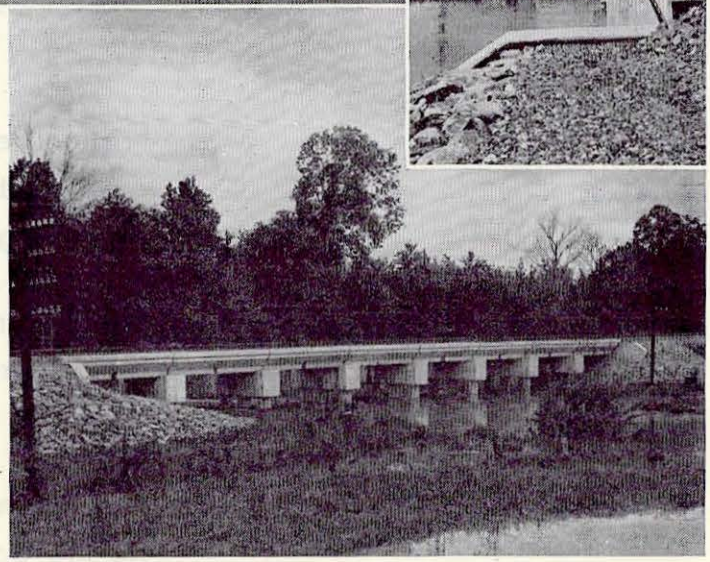
Freight cars equipped with "COIL-ELLIPTIC" spring groups are relieved from injurious vertical shocks and carry their lading safely at all speeds.

Our spring shop provided with modern facilities for the double heat treatment of springs to meet the new A. R. A. specifications, assures a quality product and a dependable source of supply.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS





This type was developed by the Missouri Pacific Railroad to insure safe, continuous and efficient service, under all operating conditions.

3 INSTEAD OF 6

tell their own story

but—THERE'S MORE ECONOMY

Bents of three 24-inch reinforced concrete piles, instead of the usual bents of five or six piles, have proved to be efficient and economical in constructing permanent concrete trestles.

Each 24-inch pile drives as fast as a 16-inch one. The driving time is greatly reduced because: there is no shifting of stringers. Only 3 piles are driven to the bent.

This means a minimum of traffic interference —low cost.

Tests show that these 24-inch piles have more than twice the load capacity of 16-inch piles, *and still more than smaller ones.* Longer spans may be used.

The net—Fast, permanent construction at low cost.

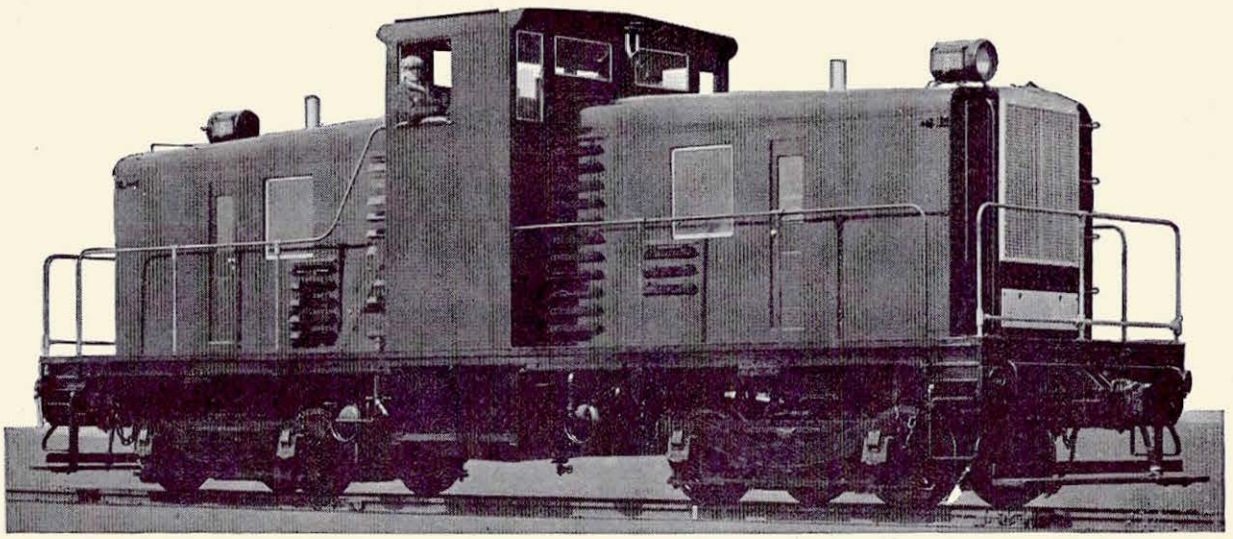
Information on request. Write Room 1982, care of:

PORTLAND CEMENT ASSOCIATION 33 W. GRAND AVE., CHICAGO
CONCRETE FOR PERMANENCE

NEW DIESEL ELECTRIC LOCOMOTIVE

FOR A WESTERN PENNSYLVANIA RAILROAD

HAS OVER 8 HP. PER TON



This new locomotive has two generating units, each driven by a 4-cylinder Diesel engine.

● A new Westinghouse Diesel Electric Locomotive recently placed in service by a railroad in Western Pennsylvania, has engines rated continuously at 530 hp.—yet weighs only 65 tons!

This unusually high horsepower per ton is 60 per cent greater than that for early designs of Diesel locomotives. Such high power makes the new locomotive particularly well suited for both switching and transfer service.

This locomotive effects remarkable economies in fuel costs. The fuel consumption is only 5 gallons of oil per *actual* service-hour.

The cab construction, like that for all models of Westinghouse Diesel Electrics, gives full visibility for a single operator. This, with such features as a spacious cab with dual control and effective braking, results in maximum safety and convenience of operation. Engine rooms with wide aisles and adequate overhead clearance simplify maintenance and inspection.

★ ★ ★

Westinghouse Diesel Electric Locomotives, in sizes from 65 to 110 tons, 265 to 800 hp., and Rail Cars from 400 to 800 hp., are in operation in all sections of the country. Accurate records show that they effect savings over steam operation sufficient to pay for themselves in two to four years.

An engineer from the nearest Westinghouse office will be glad to assist you in a study to determine the economies Diesel Electrics can effect on your railroad. Send the coupon for additional information.

Westinghouse

Quality workmanship guarantees every Westinghouse product

SEND FOR INFORMATION

Westinghouse Electric & Manufacturing Company
Room 2-N—East Pittsburgh, Pa.

Gentlemen: Please send literature checked:

☐ Diesel Electric Locomotives
☐ Diesel Electric Rail Cars

Name.....
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Position..... T 79553
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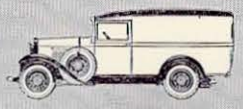
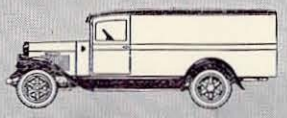
½ TON TO 7½ TON..

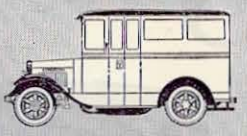
INTERNATIONAL HARVESTER OFFERS MOST COMPLETE LINE OF TRUCKS . . . BACKED BY THE WORLD'S LARGEST COMPANY-OWNED TRUCK SERVICE ORGANIZATION



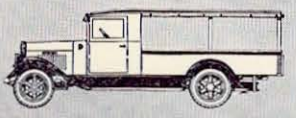
½-ton Model D-1; wheelbase 113 in.



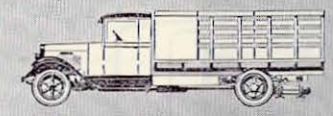
¾-ton Model A-1; wheelbase 136 in.



Model M-2, for door-to-door delivery.

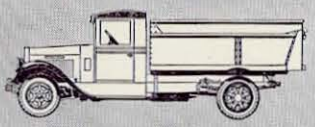


1½-ton Model A-2; wheelbases 136 and 160 in.

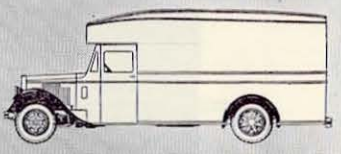


1½-ton Model B-3; wheelbases 136 and 160 in.

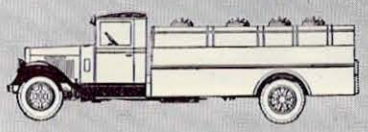
2-ton Model B-4; wheelbases 145, 170 and 185 in.



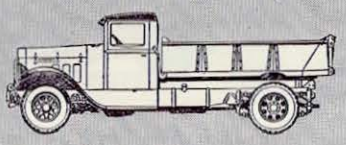
2-ton Model A-4; wheelbases 145, 156, 170 and 185 in.



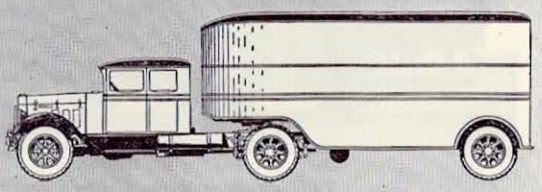
3-ton Model A-5; wheelbases 140, 156, 170, 190 and 210 in.



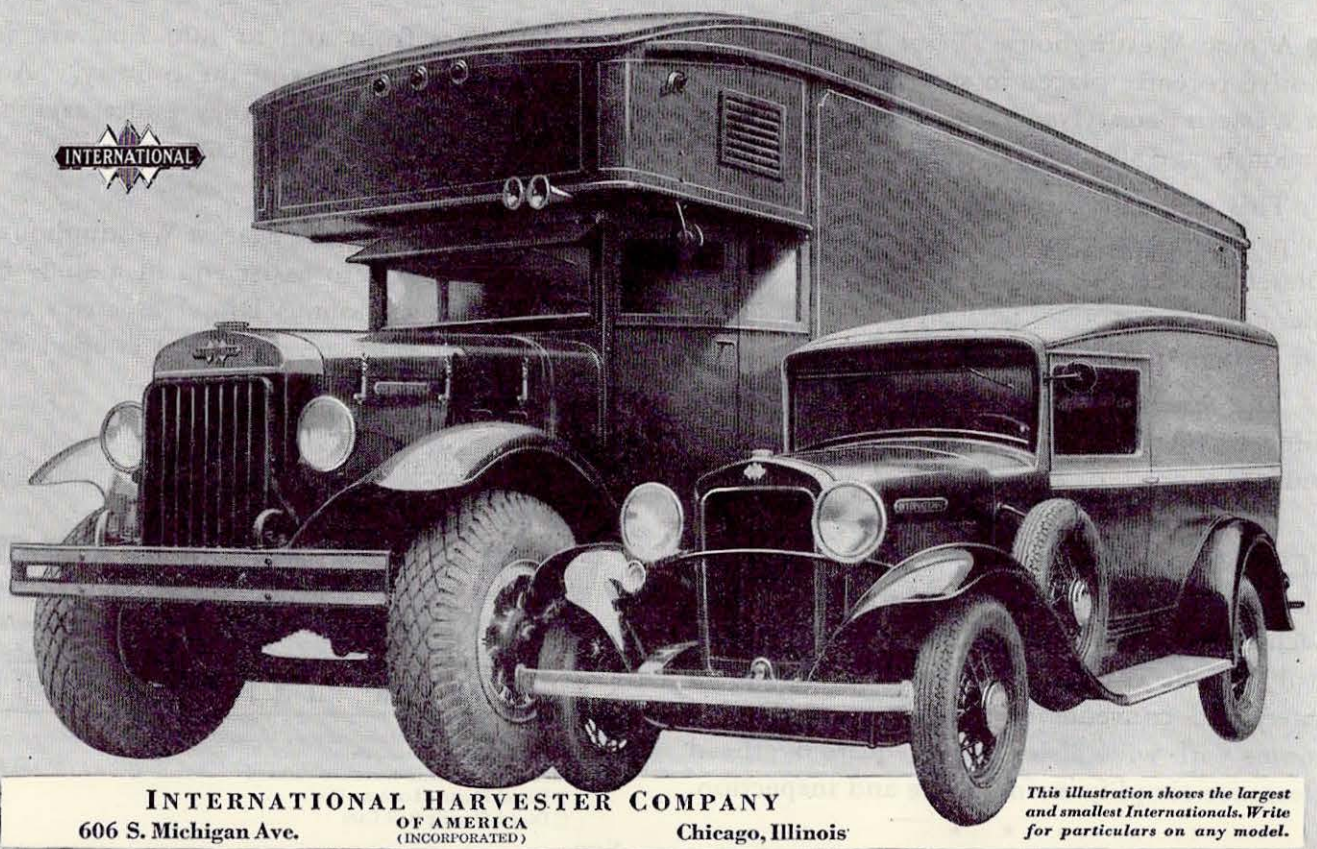
3-ton Model A-6 wheelbases 140, 156, 170, 190 and 210 in.



5 to 7½-ton Model A-7; wheelbases 160, 180, 200 and 225 in.



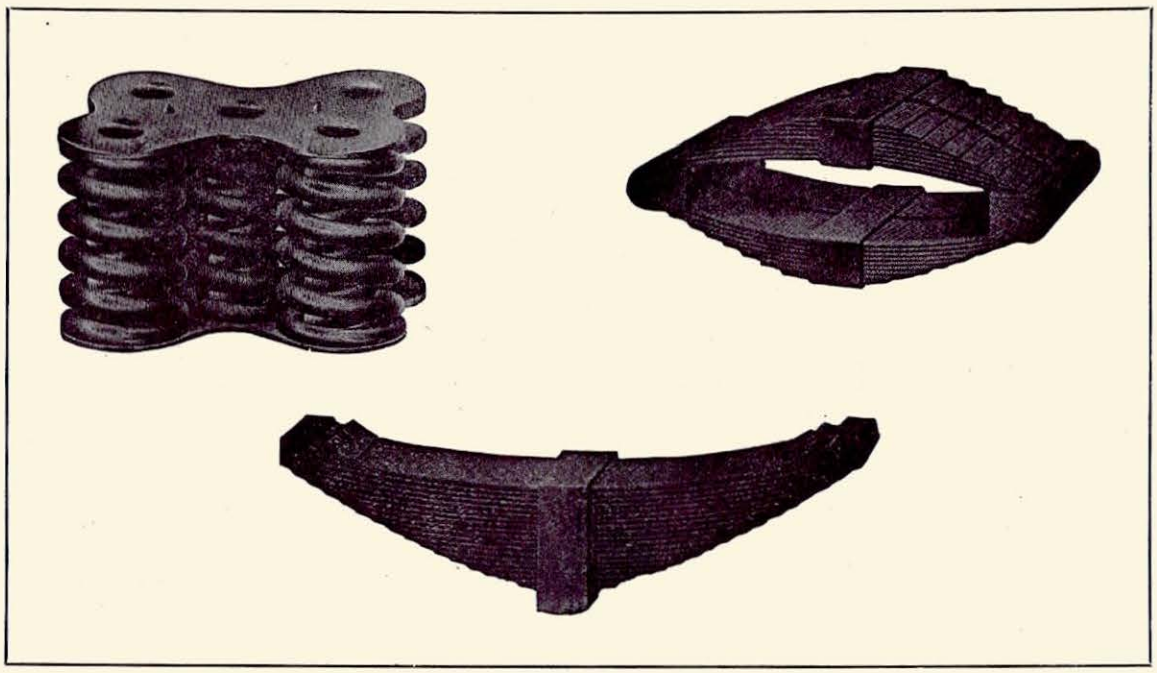
7½-ton Model A-8; wheelbases 160, 180, 200 and 225 in. Shown with semi-trailer.



INTERNATIONAL HARVESTER COMPANY
OF AMERICA
(INCORPORATED)
606 S. Michigan Ave. Chicago, Illinois

This illustration shows the largest and smallest Internationals. Write for particulars on any model.

INTERNATIONAL TRUCKS



It just can't be done

Railroad Officials who approve the reclamation of springs in their own shops do not save money by doing so. It simply can't be done that way.

A repaired spring must be equal to a new one in uniformity and performance. Otherwise it throws parts out of alignment and unbalances the equalizing mechanism. To be equal to new it must be as carefully reworked and heat treated as a new spring. This involves too much costly machinery to be justified by the small volume in tonnage that any one railroad has to handle. It requires skilled workmen who are employed steadily at spring making. It should be directed by a well-rounded organization with every facility for advancing the art through constant research.

Seldom can a railroad justify this organization and equipment and so it is better in every way to send broken springs to us for reclamation.

Railway Steel-Spring Company

30 CHURCH ST., NEW YORK

Branch Offices:

Chicago, Ill. Washington, D. C. Cleveland, Ohio Pittsburgh, Pa. Montreal, Que.
St. Paul, Minn. St. Louis, Mo. Denver, Colo. San Francisco, Cal.

A standard car is economical.

Then why not a standard roof?

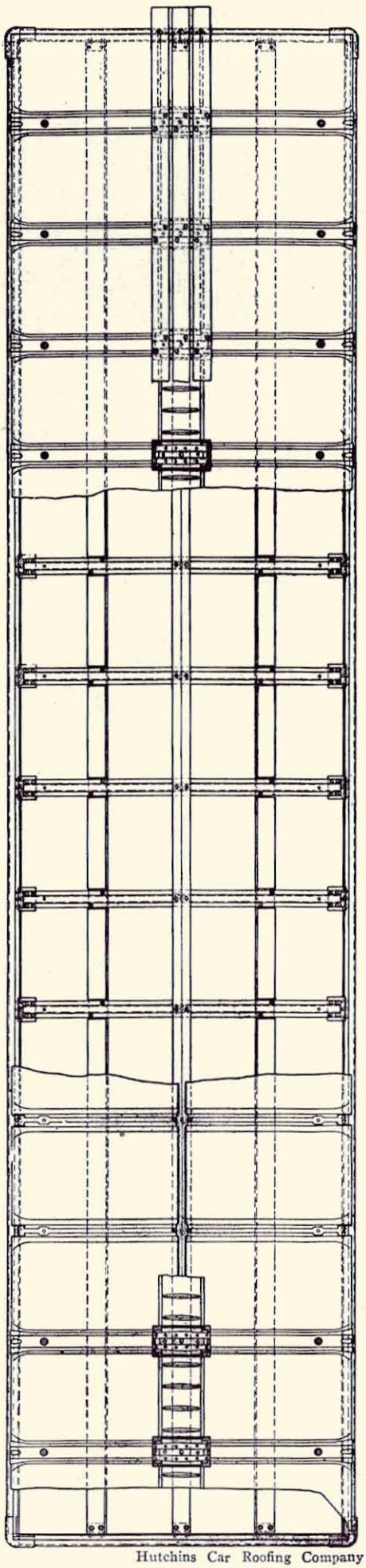
A riveted roof is certainly not a standard roof. (*It is standard only for the size and design of car for which it was made.*)

A standard roof must be a roof that has one size and one design parts that will fit any and all new cars of any size and design, also all existing cars operating on standard gage tracks.

The UNIVERSAL DRY LADING ALL STEEL ROOF is such a roof —it has one size and one design parts and is adjustable.

Some have a mistaken idea that a Riveted roof holds the car frame the strongest and most rigid. Figure it out for yourself. You will find that it is really the Universal roof, it has longitudinal members (not found in any riveted roof). Plan view shows why—it is patterned after the underframe of a car.

Inspection of cars shows Universal roofs are outwearing Riveted roofs respectively one to two.



Hutchins Car Roofing Company

RAILWAY AGE

NRA and the Railways

Since the railways are already subject by law to a "code" of fair competition much more severe and minutely restrictive than any of those applied to other industries through the NRA and since their level of wages and working conditions is much more favorable to labor than those of most industries under the NRA, it is not surprising that the attempt of the railway labor executives last week to induce the President also to impose NRA restrictions upon the railways met apparently with little success.

Mr. Whitney's Proposal

What regulations could the NRA possibly impose on the railways which generations of legislators and regulators have not already placed in effect? A. F. Whitney, who acted as the spokesman for the labor delegation, disclosed his views in this connection in an interview with the press following the audience with the President. He stated that there would be no difficulty in applying the principles of the Recovery Act to train service employees; all that would be necessary would be to reduce the "basic day" from 8 hours or 100 miles to 6 hours or 100 miles. This, however, is something quite different from the reductions in working hours heretofore sponsored by the NRA. For most train service employees, with train speeds what they are today, the miles run are the actual basis of payment and most of these employees are earning the pay for their monthly minimum mileage right now in a total of hours lower than those provided for in many of the NRA codes. For example, a freight conductor working on a monthly basis of 3,000 miles would earn about $179. If his runs were confined to trains averaging 20 miles per hour—and many freight trains do much better than that—he would earn his month's wages in 150 hours, or approximately 33 hours per week. At the average freight train speed—which was 15.8 m. p. h. in May—this conductor would earn his month's wages in approximately 190 hours or 42 hours per week and his average hourly earnings would amount to 94 cents.

It may well be doubted whether the NRA could seriously concern itself with wage rates (only 10 per cent lower than those of 1929) and working conditions as favorable as those prevailing on the railways—and especially in train service where pay is usually on a mileage basis and where working rules are such that mileage allowances are built up very rapidly in proportion to hours actually spent on duty. Also, it is to be noted that the NRA codes require an actual reduction in hours worked in order to provide more jobs. They do not provide, as did the Adamson law, the alternative of an increase in wages for the same number of hours. The officials of the NRA could not fail to recognize that the modification of the Adamson law basis from eight to six hours would not be a genuine curtailment of actual hours of labor. Nor would these officials in all probability overlook the difference between the basic hourly rates of train service employees, which appear moderate, and actual earnings per hour worked, which in some cases are very high indeed.

$1.92 for a Truck Driver, $4.68 for a Brakeman

It is, however, interesting to see that organized railway labor is alert to the existence of the NRA, since thus it cannot overlook the threat to railway employment embodied in the lower labor standards proposed by the railways' highway competitors. Mr. Whitney suggests a 6 hours-100 miles basis of pay for train service employees. One of the truck operators' associations is proposing an average working week for drivers of 48 hours, but would permit 1000 miles for some classes of trucks to be considered as equivalent to 48 hours of work. By contrast, a freight trainman now receives compensation for 80 hours for each 1000 miles run, although the time actually worked may not be more than half of that. The truck operators propose 40 cents an hour as minimum wages for drivers which, computed on the proposed basis of 48 hours compensation being allowed for 1000 miles run, figures out to $1.92 per 100 miles. By contrast a freight conductor receives $5.96 per 100 miles and a freight brakeman receives $4.68. Moreover the truck operators do not propose to pay anything for "dead-heading."

It is perfectly clear that a form of transportation fairly comparable in average speed to railroad freight service which proposes to pay its employees on a mileage basis wages less than half of those of comparable railroad employees will be enabled to bid for traffic which it could not secure if it paid higher wages. The

President himself spoke very clearly on this subject in his radio address on July 24, as follows:

"Last Autumn on several occasions I expressed my faith that we can make possible by democratic self-discipline in industry general increases in wages and shortening of hours sufficient to enable industry to pay its own workers enough to let those workers buy and use the things that their labor produces.

"This can be done only if we permit and encourage co-operative action in industry, because it is obvious that without united action, a few selfish men in each competitive group will pay starvation wages and insist on long hours of work. Others in that group must either follow suit or close up shop. We have seen the result of action of that kind in the continuing descent into the economic hell of the past four years.

"There is a clear way to reverse that process: If all employers in each competitive group agree to pay their workers the same wages—reasonable wages—and require the same hours—reasonable hours—then higher wages and shorter hours will hurt no employer."

The several agencies of transportation certainly are a "competitive group" such as the President mentioned and unless the wage rates of all of them are fairly comparable for employees doing similar work, then that portion of the industry with high wages will have to maintain higher prices and will thus lose business to the low-wage branches of the industry. As its business declines so will the jobs it provides. Insistence upon similar standards for labor in all forms of transportation is essential to the maintenance of a fair degree of employment and favorable labor conditions on the railways.

Who Should Pay for "Super-Highways"?

The work of adding to the surplus transportation plant of the country goes rapidly forward—at the taxpayers' expense. Not content with a plentitude of good roads the "highwaymen" are demanding, and getting, many miles of viaducts and costly "super-highways" built to high standards of grade and curvature elimination, and with no intersections. The truck or bus operator provided with such a facility by the indulgent taxpayers simply puts his foot down on the gas and keeps it there, and motor transport, thanks to the much heavier contribution of the taxpayer, becomes "cheaper" and faster than ever.

The latest proposal for a collossal project of this kind is one for a 474-mile "super-highway" from Boston to Washington, D. C., the construction cost of which through Maryland alone is estimated at $14,000,000. Says the Wall Street Journal:

> The proposal calls mainly for the improvement of the U. S. Route No. 1 from Boston to Washington, with by-passes around large cities and the elimination of existing bottlenecks, narrow bridges, grade crossings and other traffic hazards. The new route would be at least four lanes in width throughout and wider in metropolitan and congested areas where the volume of local traffic is heavy. The built-up and business sections of Boston, New York, Newark, Trenton, Philadelphia, Baltimore and other cities where normal traffic is heavy and the cost of widening the right of ways is prohibitive, will be avoided.

One of the proponents of the plan justifies the expenditure by the plea that it will save the users of the road more than it will cost the taxpayers. But if the saving is going to accrue to the users, why should not they, rather than the taxpayers, pay for it? Is it not about time that the joker which was written into the federal aid highway law, prohibiting tolls on federal aid roads, was repealed and that a reasonable fee be assessed on all traffic which uses such collossally expensive facilities? The taxpayers cannot continue to bear indefinitely the ever-increasing burden of such expense.

It is interesting to note that in Germany, where the construction of a network of super-highways is projected, the plan provides for a system of tolls which would make the traffic bear the costs. That is the only sensible policy of financing projects of this kind and one which sooner or later must be adopted in this country.

Smoke Prevention and Passenger Travel

Dirt has long been accepted as a necessary accompaniment of railroad travel. When added to the other discomforts of hot weather the smoke and cinders which pour in through the open windows of passenger coaches, whether screened or unscreened, constitute a formidable obstacle in the way of the development of passenger travel for recreation during the vacation season. This problem will probably not be completely solved until the use of air-conditioning equipment has become general. In the meantime much can be done to improve conditions by attacking the production of smoke and cinders at the source.

Smoke prevention is no new thing. It has long received consideration, first, to satisfy the insistent demand of the public for the elimination of unnecessary smoke in cities, and, second, in its relation to economy in the use of fuel.

There has been no recession in the attitude of the public toward the smoke nuisance in cities. The old idea that a job of smokeless firing is an economical job of firing, however, has lost its effect partly as the result of relaxed supervision on behalf of fuel economy and partly because of an entire change in the approach to grate and firebox conditions resulting from numerous efforts to utilize lower grades of fuel in the locomotive firebox. As a result of these conditions there has been a widespread increase in the emission of smoke from locomotives when outside of those terri-

tories where smoke prevention is enforced by law—a condition which has not tended to improve the standing of the railroads as a passenger-transportation medium.

Smoke prevention has never received general consideration as a means of improving the attractiveness of railway service to railway patrons. When no other means of travel but railways was available, the public had to accept smoke and cinders as a necessary evil. The cleanliness of travel by automobile or motor bus on hard surfaced highways, however, has changed this situation. The dirt and discomfort of railway travel undoubtedly also weighs heavy in favor of ocean travel for recreation in the case of many persons to whom the seaboard is readily accessible.

As long as steam locomotives are operated some smoke and some cinders will undoubtedly be emitted from their stacks. That a large proportion of both may be prevented, however, with proper equipment and correct firing practice, has been demonstrated too many times to be open to question. The American public is becoming more and more fastidious. Is it not time for the railroads to give serious consideration to smoke prevention as a means of improving the attractiveness of their own service?

Grade Crossing Elimination

The National Industrial Recovery Act was enacted as an important step in the President's program of emergency legislation to meet the economic crisis. One section of this act directs the expenditure of $3,300,000,000 for public works as a means for relieving unemployment. In this portion of the act one section (No. 204) sets aside $400,000,000 for emergency construction of public highways and related projects, including "the separation of grades at crossings, the reconstruction of existing railroad grade crossing structures, the relocation of highways to eliminate railroad crossings." Elsewhere in the act provision is also made for the payment by the federal government, from funds other than the $400,000,000, of 30 per cent of the cost of public works projects of certain types approved by it if the local governments in sections where the work is to be done are prepared to finance the remaining 70 per cent.

The grade crossing has long been recognized by the railways and the public alike as a hazard. In 1932, for illustration, 1,525 of the 4,524 persons killed in train accidents met death at highway grade crossings, while 3,989 of the 17,157 persons injured were so injured at these crossings. This condition has not been created by the railroads, but by motor vehicles. Furthermore, the railways are confronted with the fact that the heavy capital expenditures involved in the elimination of these crossings yield practically no return to the railways, which point the Interstate Commerce Commission had in mind in its decision in the 15 per cent rate case in 1931 when it said that "to the extent that it (the burden of expenditures for grade separations) is caused by other than railroad needs and does not increase the traffic of the railroads or save them expense, it may be that this burden should justly be shifted from the shoulders of railroad users." The Public Works bill, with its specific appropriation for highway improvement, offers a solution for many of these grade crossing elimination problems, for in rules which have been promulgated for the distribution of this fund, the Chief of the Bureau of Public Roads has placed grade crossing elimination second in order of priority among proposals to be considered.

In a statement prepared within the last month, engineers of 10 of the leading railroads point out that (1) the purpose of the Public Works bill is to relieve unemployment as quickly as possible, (2) this relief should be extended to skilled as well as unskilled labor, (3) grade separation work requires equally as much unskilled labor as an equivalent expenditure for road construction, and in addition requires a greater amount of labor of higher grades, the total expenditure for labor for grade separation being estimated, in a recent statement by Federal Co-ordinator Eastman, as 35 per cent, as compared with 20 per cent for the general run of highway construction, (4) in grade separation projects the work is concentrated, meeting local unemployment needs and minimizing the need for camps and their frequent shifting, (5) grade separation projects require a wider variety of materials as well as labor, (6) many of these projects can be undertaken with very little delay. It will be recalled that it was these considerations that prompted Governor LaFollette of Wisconsin to turn to grade separation work two years ago as the means to provide the largest measure of direct employment and to initiate a program for 92 projects, or more than would normally be undertaken in three years.

In the administration of the public works portion of the Industrial Recovery Act, and in the allocation of the $400,000,000 appropriated therein, the initiative for the selection of highway projects, including those for the elimination of grade crossings, rests with the state highway commissions. It is necessary, therefore, that the railways work with the commissions in the various states through which they operate and submit to them suggestions for those separations which they believe should be included. Already, committees of railways have been organized to work with the highway officers in several states, notably Illinois. This procedure should be effected universally at the earliest possible date, in order that the greatest impetus may be given to the President's program for the relief of unemployment and the expenditures be made where they will bring about the greatest benefits to the public in safety as well as in service, rather than adding further to our national transportation plant, which is already overbuilt.

Zeolite Water Treatment Meets With Favor on Northern Pacific

Results from plants installed for treating locomotive and other supplies show that this method has decided advantages under certain conditions

By E. M. Grime

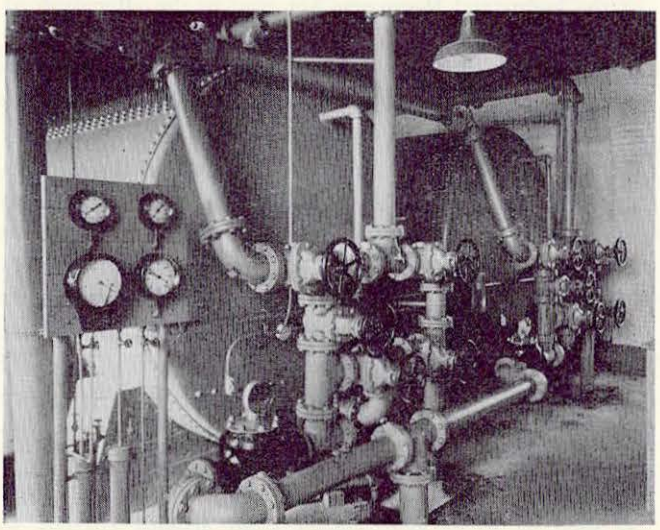
Engineer of Water Service, Northern Pacific, St. Paul, Minn.

IN 1925 the Northern Pacific made a survey of the bad-water districts on its lines to determine the most effective and economical method of treating the various water supplies on those districts. At that time the lime-soda softening process was generally accepted as the standard method of treating locomotive supplies, but the conditions that were revealed by the survey indicated that the demand for water at a number of places would not justify the expenditure required for this process. Also, at some locations the disposal of sludge would be rather costly, and at other points the attendance necessary for lime-soda treatment would be relatively high.

The zeolite method of softening water had been applied for years in the industrial field, but there was little in the way of precedent for the application of this method to the treatment of locomotive supplies. Yet, it was apparent from the chemistry involved that there was no sound reason why this type of treatment should not produce an entirely satisfactory locomotive boiler water, and, therefore, in working out the details of a water treating program the zeolite method was given full consideration.

Zeolite Method Is Simple

The zeolite process for softening water has somewhat the characteristics of a filter in which the raw water flows through a bed of zeolite, which may be the zeolite mineral or "green sand," either as it occurs in natural deposits and suitably processed, or as it has been prepared artificially. Zeolite is a sodium compound that has the peculiar property, when brought in contact with water, of exchanging its sodium base content for the calcium and magnesium of any encrusting solids dissolved in the water, leaving practically nothing but non-scaling soluble salts in the water. The zeolite bed is regenerated at intervals, that is, the sodium content is restored, by passing a brine of common salt through it. The waste products of this regeneration are calcium and magnesium chlorides which are in a liquid state and therefore can be disposed of in an ordinary sewer.



These Zeolite Softeners at Laurel, Mont., Each Handle 100,000 Gal. of Water, with a Hardness of 8 Grains per Gallon, after Each Regeneration

The zeolite bed is supported in a tank on a bed of gravel, graded from coarse to bird-shot size, arranged to allow water to pass through without appreciable loss of the mineral. In order to obtain the highest efficiency, certain maximum and minimum rates of flow per square foot of mineral are required. The flow of water through the bed of mineral may be either downward or upward.

Various designs of zeolite water softeners are on the market, but the essential detail is a suitable arrangement of perforated heads or a strainer plate that will effectively collect or distribute the water flow in such a manner as to avoid channeling of the mineral bed. For the removal of each grain of hardness per 1,000 gal. of water, this type of treatment usually requires not to exceed ½ lb. of salt. A few waters, high in non-incrusting alkali salts, may require a fractional increase in the salt dosage. For a given water requirement, the softener is proportioned to allow for reasonable intervals between regeneration periods. Regeneration by passing salt brine through the mineral bed requires from 30 to 40 min., during which time no softened water is available. For this reason duplicate units are frequently installed.

Equipment Is Compact

Zeolite is particularly adaptable to the treatment of clear waters in which permanent hardness characteristics predominate, because salt is usually less costly than soda ash. As the equipment is compact and requires a minimum of floor space, it can often be located in a basement or other unused space that may be available. Moreover, zeolite plants can be located where the dust from lime and soda ash would be objectionable.

The operation of a zeolite softener usually requires less chemical supervision and there is less likelihood of errors on the part of the operator than is the case with lime-soda plants. Where space in an existing building is available the cost of a zeolite softener will be less than for a lime-soda plant, but if an entirely new plant

is built the cost per 1,000 gal. of treating capacity will be about the same.

Actual experience during three to five years' operation of zeolite softeners has demonstrated the value and convenience of this method of treating locomotive boiler water. It may be of interest therefore to describe some of the conditions under which we have found it desirable to make use of the zeolite method, together with the results secured.

Saves Money at Minneapolis and St. Paul

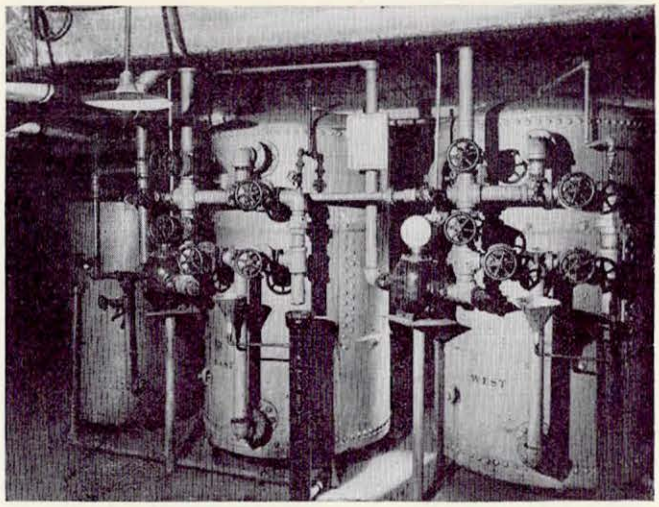
At the Minneapolis coach yard, a small stationary plant is used for heating purposes during the winter season. The use of city water having 10 grains per gallon of hardness required an auxiliary boiler for use during the frequent washout periods necessitated by the scale accumulation due to this water. A small zeolite installation costing $600, located in vacant space in the boiler room avoided replacement, at an expense of about $1,200, of the auxiliary boiler which had about served its usefulness. The regular attendant cares for the zeolite softener at no extra expense, the salt used costs only 2½ cents per 1,000 gal. of water softened, and the one boiler now in service is kept so nearly perfectly clean that washing at the end of the heating season is all that is required.

A stationary boiler plant at Third street in St. Paul supplies steam heat and hot water for the dining-car commissary department, and an adjacent coach yard, and water for switch engines. The use of city water having 10 to 14 grains of hardness had caused excessive boiler maintenance due to the accumulation of heavy scale and the internal use of soda ash had not been effective in the prevention of boiler-tube corrosion. The water demand at this plant varies from 4 to 68 gal. per min., depending on the steam requirements, and the amount of make-up water required may run as high as 90 per cent of the total. In common with most stationary plants where condensate is used, there is always a possibility of corrosion because of the accumulation of free oxygen and carbon dioxide gas from air leakage into the vacuum heating system. While the sodium bicarbonate of the zeolite-softened water soon hydrolizes to form caustic alkalinity and tends to prevent active corrosion, the use of an open-type feed-water heater for direct elimination of corrosive gases was considered desirable.

A double-unit downflow type zeolite softener with a capacity of 30,000 gal. between regenerations with 10-grain water was provided for this plant. The attendants at the power house take care of the operation within their regular tour of duty; thus making no increase in labor expense. The boilers are washed at 30-day intervals, there is no scale accumulation and the corrosion has been completely eliminated. Switch engines using this water experience no difficulty by reason of mixing hard deep-well water from another supply with this treated supply.

Two Plants at Brainerd

At Brainerd, Minn., the main shops of the railroad include a modern power plant. City water having a hardness of about 13 grains had been used in the old boilers but with the new modern plant operating under higher rating and pressures, and having centrifugal feed-water pumps, the hard water soon began to cause trouble. In spite of the application of internal soda-ash treatment, there was not only heavy boiler scale accumulation, requiring frequent washing of the boilers, but the feed pumps and boiler lines soon filled up with



Zeolite Softeners of a Type Suitable for Moderate Demands, Treating 12,500 Gal. of Water Each (11-Grain Hardness) Between Regenerations. Installed in Station Basement at Billings, Mont.

incrustation and required too frequent cleaning for satisfactory operation.

A down-flow type zeolite softener having a capacity of 17,000 gal. between regenerations and with a normal softening rate of about 4,000 gal. per hour, was provided. This is located in an unused part of the plant and is operated by the chief engineer or his assistant. An alarm bell in the boiler room gives warning when the softener is approaching the time for regeneration. The additional expense for this improvement and the cost of treating the water are trifling compared with the marked increase in operating efficiency obtained.

Similar difficulties with the city raw water were encountered at the stationary plant which operates the railway tie and timber preservation plant at Brainerd, and a smaller zeolite unit was provided for this location. The capacity of this unit is 3,890 gal. between regenerations and care of the plant is readily given by the stationary engineers as a part of their regular work.

Ideal Method for Small Supply

At Bismarck, N. D., an emergency locomotive supply station is located on the main line, at which the demand seldom exceeds 5,000 to 10,000 gal. per day, and although clear city water is available it contains from 6 to 18 grains of hardness, which justifies the softening of the water if it is to be used with the lime-soda treated water from the stations at Sterling, N. D., on the east and Mandan on the west. Zeolite treatment was obviously advantageous for this small supply because the clear water is admirably suited to this treatment, the attendance can be taken care of by a freight-house clerk, the drainage waste can be discharged into the city sewer and the plant is installed in available space at the freight house. There has been no complaint from enginemen with reference to foaming or other difficulties caused by mixing this water with the lime-soda treated water from adjacent stations.

Lime-soda softening plants supply locomotives at Mandan and Glendive, Mont., but as water is also supplied to passenger, Pullman and dining cars at these points, it is desirable to have water with no caustic alkalinity. For this reason small zeolite plants for softening the city water have been located in basement rooms of the depots at each location. These softeners float on the city pressure line in each case and are arranged to operate automatically with the water demand. At certain periods of the day, when supplying only the

lunch-room kitchen and depot facilities, they operate at very low rates, but when a train is being served the flow rate is increased. At Mandan the demand is such that a small storage tank for softened water is filled during the slack period and, drawing from this supply, an electrically-operated booster pump steps up the flow rate to supply passenger trains in the few minutes allowed for a stop. At each place the salt storage is also in the depot basement and the operation of the softeners is handled by carmen within their regular tour of duty.

Sanders, Mont., is another main-line station where the demand is nominal, but the station must be maintained for use by local freight trains and in emergencies by tonnage trains that cannot reach the next terminal because of unfavorable weather conditions or delays due to other causes. A clear well water comparatively high in sulphate content makes zeolite treatment economical as to chemical cost, gives a product with a trifle less total soluble salts than lime-soda treatment, and the attendance is handled at minimum cost by a track laborer outside of regular working hours. The results are entirely satisfactory for locomotive service. Regular sanitary analyses are secured through the state board of health so that the water is always available for the filling of extra-gang water cars and is used by the agent and others for household purposes.

At Huntley, Mont.

An important main line station, which serves the Chicago, Burlington & Quincy, as well as the Northern Pacific, is located at Huntley, Mont., and the water at this point must be such as to blend satisfactorily with lime-soda treated water at adjacent stations on both railways. The supply is from seepage from the Yellowstone river and adjacent underground sources. Its sulphate hardness at some periods closely approaches the carbonate hardness, and at all times zeolite softening is economical from the chemical standpoint and gives total solids in as small amounts as would be available from other methods of treatment. Turbidity in the supply is a problem here, and a pressure filter using alum as the coagulant is used to reduce this to the point where the zeolite softener can handle the water without excessive washing. In this installation it was possible to utilize existing gasoline pumping equipment and the filter as well as the softener float on the pump discharge line, making only one pumping necessary.

Clear potable city water is available at Billings, Mont., but as the hardness varies from 3 to 25 grains it is very desirable to have a softened water that is perfectly uniform in quality so far as incrusting salts are concerned. The zeolite method is particularly advantageous for this situation, especially since the sulphate of the raw water is frequently a large part of the total hardness. Two softeners are provided, one duplicate unit located in the depot basement to serve passenger equipment, the depot and lunch-room hot water lines, the stationary plant used for heating the depot and coach yard, and passenger locomotives, and another softener at the enginehouse plant for supplying switch and freight locomotives. Neither of these plants required the construction of special housing facilities or any increase in the labor force for attendance, and the results have been entirely satisfactory.

At the time the zeolite plant at Laurel, Mont., was constructed it was one of the largest plants of this type that had been installed for supplying water for locomotives. Laurel is at the west end of what for years has been one of the worst water districts east of the Rocky mountains, and this station requires a water that will combine readily with the raw water from the stations to the west. The supply is taken from the Yellowstone river at the city intake. Although given settlement and some alum treatment at the city plant, its turbidity when it reaches the railway plant a mile distant is frequently in excess of 20, and a pressure filter using alum coagulant was therefore installed to reduce the turbidity to 5 or less before the water enters the softeners.

Duplicate upflow type softeners are provided at Laurel, having a total capacity of 160,000 gal. between regenerations when using a water having a hardness of 10 grains. The hardness of this water varies between 3 and 25 grains, depending upon the seasons, but the softener is located adjacent to the enginehouse plant where the chief stationary engineer or his assistant can give it careful attention, and there has not been a serious failure due to lack of regeneration at the proper time.

No Increase in Foaming

Locomotives of the Burlington, the Great Northern and the Northern Pacific coming from treated water territory are serviced at the Laurel terminal and, although there have been times when the high content of soluble salts in the softened water, largely due to irrigation seepage water, made it desirable to use a small amount of anti-foam compound to improve the operation of westbound tonnage freight trains, the operation on the whole has been entirely satisfactory and the change from the treated to the untreated water has been hardly noticed by the enginemen. Evidently this zeolite treated water of practically zero hardness develops no increase in foaming qualities when mixed with lime-soda softened water.

Westward from Laurel for 600 miles, with a few exceptions, the Northern Pacific enjoys excellent water conditions, but beyond this territory in the arid region of Eastern Washington the supply is not as good, and as a rule deep wells must be resorted to, that produce hard waters with considerable sulphate content. These waters are clear and from the chemical standpoint are admirably suited to zeolite treatment. At two of the plants sludge disposal would be a serious problem with lime soda treatment. Zeolite treating plants at three stations in this territory; namely, Cheney, Wash., Ritzville and Lind, have now been in operation since December, 1930, and have worked out very satisfactorily. Their installation has shown a substantial saving as compared with the cost of internal boiler-water treatment which was previously necessary to keep down scale accumulation in that district and the enginemen have hardly been aware of the change from raw to treated water conditions.

Experience with 16 zeolite plants under a wide variety of conditions on the Northern Pacific, has demonstrated that this method of water softening is entirely practical and, under certain conditions, most economical.

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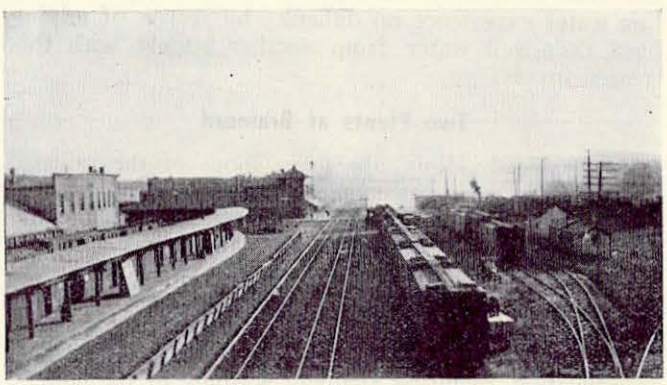

On the Missouri-Kansas-Texas at McAlester, Okla.

Preparing Journal Bearings for Service

Tests of special broaching method indicate possibility of reducing friction from 50 to 90 per cent

THE most important period in the life and service of any bearing is the initial period following application. The practice of operating at restricted loads and speeds until the bearing is broken in is well established in the operation of bearings in practically all fields of application. The only function of this initial period of restricted operation is to adapt the surface of the journal or shaft to the bearing surface. The degree to which this process is completed has a great effect upon the life and efficiency of the bearing.

To insure a quick termination and successful operation of this break-in period broaching, scraping, grinding, fitting and other methods of carefully preparing the journal and bearing surface are carried out in preparing the bearing for service.

Many comparisons of other types of bearings with the standard railroad journal bearing, that have resulted unfavorably to the latter, have been predicated on the premise that the standard journal bearing was advanced and maintained to its highest possible standard. This has never been the case. One important feature is that of initial preparation of the bearing. The railroad journal bearing, and particularly the car journal bearing, cannot be subjected to a controlled condition of restricted load or speed. Immediately on its application, it must take its place with bearings which have had long periods of previous operation on the same unit of equipment. Therefore, instead of no preparation at all, or a very superficial preparation, the railroad car journal bearing should be adequately prepared, since its satisfactory operation is of primary importance and the requirements of service severe.

The practice of broaching car journal bearings by the manufacturer or the user has been quite general. However, the economy or justification for this operation has been open to question, in view of the fact that many bearings so prepared fail during the initial service period. In some cases this has led to abandoning broaching and applying rough bearings directly to the journal. Unfortunately, a distinction has never been made between the service results of bearings unbroached, bearings improperly broached, and bearings properly broached. Obviously, until such performance data were available, any conclusions as to the merits of broaching car journal bearings or not broaching, and any performance of the car journal bearing with any other bearings, has been founded on false assumptions.

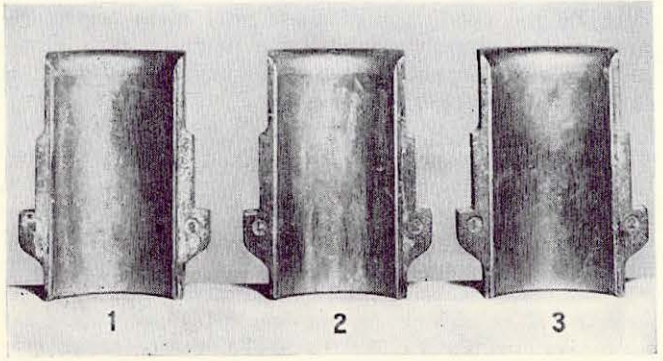

Fig. 1—Standard 5½-In. by 10-In. A.R.A. Bearings as Received from the Manufacturer Unbroached

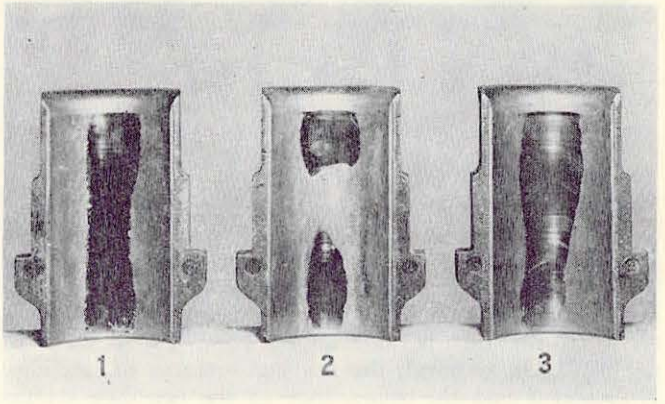

Fig. 2—Bearings after First Test Showing Conditions of Bearing Surface Causing Excessive Heating

Recognizing the above conditions a prolonged study of broaching, as the practice influenced the performance of car journal bearings, has been in progress in the test plant of the Railway Service and Supply Corporation, Indianapolis, Ind. The results of the study may be crystallized by the performance of three bearings selected at random from a lot of one hundred new bearings.

Fig. 1 shows these three 5½-in. by 10-in. A.R.A. bearings as received from the manufacturer unbroached. Fig. 2 represents the same bearings, after being subjected to operation under a total load of 16,375 lb.; bearing No. 1 operating for 19 min. at 30 m.p.h; bearing No. 2 operating for 26 min. at 30 m.p.h; and bearing No. 3 operating for 30 min. at 30 m.p.h. and 9 min. at 20 m.p.h. These bearings were removed because of excessive heat and wiping of the journal lining, temperatures of the bearings at the end of the periods of service being approximately 380 deg. During this period of operation the bearings showed a frictional resistance of from 7.94 lb. per ton to 9.74 lb.

Fig. 3 represents the same three bearings after the first test, broached in the usual manner. The bearings were again subjected to the same conditions of load and the same speeds. Bearing No. 1 failed after running 30 min. at 30 m.p.h. and 10 min. at 20 m.p.h. Bearing No. 2 failed after running 30 min. at 30 m.p.h. and 5 min. at 20 m.p.h. Bearing No. 3 failed after running 30 min. at 30 m.p.h. and 3 min. at 20 m.p.h. The maximum period of service obtained from these bearings was 40 min. At the time of failure the bearings had reached a temperature of approximately 380 deg. F. The effect of this standard method of broaching gave frictional resistances during the interval of operation from 5.21 lb. per ton to 10.8 lb. per ton. The bearings on removal showing the bearing surface are illustrated by Fig. 4.

The same three bearings were again broached by a special method, their appearance being illustrated by Fig. 5. Again under the same conditions of load and speed, these bearings were put in operation. Bearing

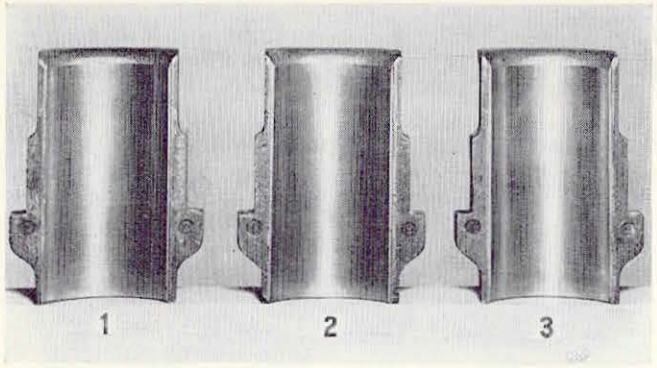

Fig. 3—Bearings after Failure of First Test Rebroached in Standard Manner

No. 1, as was also the case with bearings No. 2 and 3, ran for 30 min. at 30 m.p.h, 30 min. at 20 m.p.h. and 120 min. at 50 m.p.h. At the end of three hours the maximum temperature of these bearings was approximately 200 to 220 deg. The frictional resistances recorded for this period ranged from .87 to 2.73 lb. per ton. On removal, the bearing surfaces of bearings 1, 2, and 3 had the appearance of the bearings shown in Fig. 6.

Summary of Results

To sum up the performance, the operation of Bearing No. 3 may be considered as typical:

Length of Running Time

Speed, m.p.h.	Unbroached	Standard broached	Special broached
30	30 min.	30 min.	30 min.
20	9 min.	3 min.	30 min.
50	.....	.....	120 min.
Total time	39 min.	33 min.	180 min. (Test stopped)

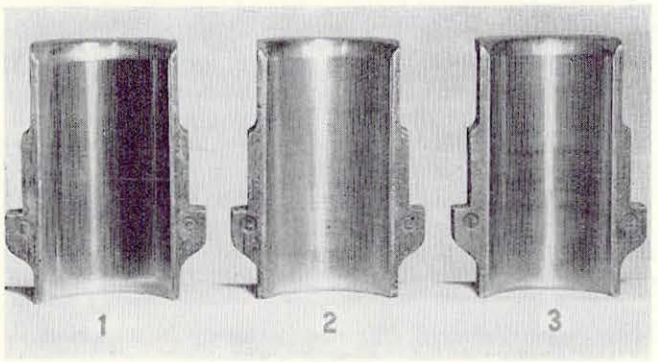

Fig. 5—Bearings Rebroached in Special Broaching Equipment after Second Failure

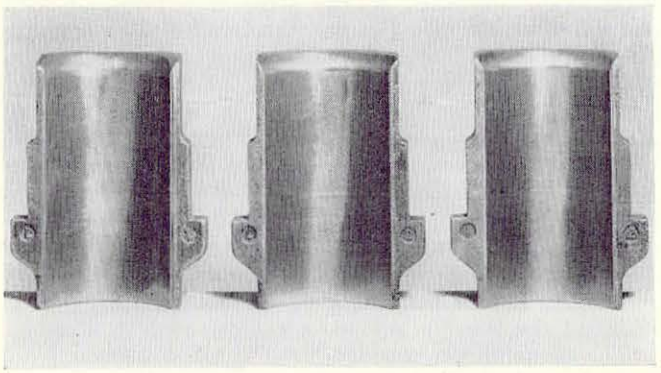

Fig. 6—Bearings on Removal after Third Broaching and Operation for Three Hours

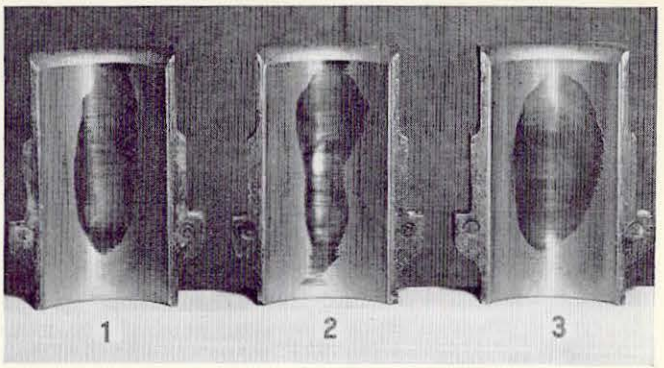

Fig. 4—Condition of Bearings on Removal Under Conditions of Second Test

Temperature, Deg. F., Crown of Bearing

Speed, m.p.h.	Unbroached	Standard broached	Special broached
30	290	321	112
20	370	380	121
50	...	...	207
	Average Resistance, Lb. per Ton		
30	5.96	5.42	2.36
20	9.74	10.88	0.87
50	...	....	1.38

The great improvement in the performance of bearing No. 3 in the last test, which was duplicated by bearings No. 1 and 2, would suggest that considerable expense would be involved to produce such results on all bearings. Fortunately, the final broaching of bearings No. 1, 2 and 3 was performed at no more expense than is incurred in the standard method of broaching.

The method by which the bearings in the last test were broached is quite evidently one that might be described as a typical, adequate and proper method. This method of broaching consists in placing the bearing face up in a special chucking arrangement which insures that the bearing surface will be broached parallel to the back. The bearing is also broached on its exact center. A comparison of conditions of the bearing after service, as shown by a comparison of Fig. 2, 4, and 6, indicates the effect upon the bearing surface of this method of broaching, as compared to the others. The bearing in this chuck is mounted in a broaching machine. The carriage supporting the chuck and its contained load is moved by a hydraulic feed. By means of a rapidly revolving cutter, the surface of the bearing is broached to a smooth, parallel, central surface, of the desired radius for the respective size journal. The head of the machine containing the rotating cutter head has motion in a vertical direction relative to the table so that the bearing may be broached to standard thickness. Cutting the fillet on the brass is the final operation performed automatically.

The conclusions drawn from the above comparison are that the proper broaching of bearings is essential to a low coefficient of friction and a satisfactory operation.

While the conditions of these tests were severe, results quite definitely establish the potential possibilities of improving journal bearing performance by the simple expedient of proper broaching.

Two passengers killed in the half-year ending with June, 1933, is the record of regular airplane passenger lines, American operated, reporting to the Department of Commerce, Washington. The total number of accidents recorded was 48, including three other fatal accidents. The miles flown by aircraft of the scheduled operators in six months totaled 25,862,120. Of the 48 accidents, 32 occurred in the daytime and 16 at night. The aeronautics branch of the Department of Commerce has an accident board of five members which investigates the causes of all civil aircraft accidents.

President Roosevelt Considers K. C. S. Wage Plan Dispute

Emergency board finds advantages in the plan but does not believe the employees will accept it

WASHINGTON, D. C.

THE President on August 19 made public the report of the emergency board appointed by him on June 12, under Section 10 of the railway labor act, to inquire into and ascertain the facts responsible for the dispute between the Kansas City Southern, the Arkansas Western and the Texarkana & Fort Smith and their employees represented by the four train service brotherhoods over a new wage plan proposed by the K. C. S., on which a strike had been voted. The board had made its report over a month ago to the President, who had referred it to Joseph B. Eastman, federal co-ordinator of transportation, for a report, and the findings of the board were not made public until after a protracted conference at the White House on August 19 with Mr. Eastman and C. E. Johnston, president of the K. C. S. Later the White House gave out a statement stating that under existing laws the President has no authority to direct a railway company to adopt any policy but that the President had addressed a letter to Mr. Johnston before he left Washington in which the President had outlined the three possible courses which he said deserved consideration. What these courses were were not made public.

The board, consisting of Frank P. Douglass, Charles W. McKay and Otto Bremer, had held public hearings at Kansas City, as reported in the *Railway Age* of July 15, page 127. After reviewing the new wage plan and the causes of the controversy the board found that the application of the new plan of paying engineers and conductors on an hourly basis instead of the dual basis of hours and miles would have increased their earnings during the first four months of 1933 and that the restrictive rules and regulations in the present wage contracts have interfered seriously with the most practical and economical operation of the railroad. However, in stating its conclusions, the board said:

The Board is of the opinion, from a complete and thorough investigation of all of the facts and circumstances in connection with this controversy, that the organizations of employees affected directly and indirectly by the proposed K. C. S. plan believe it is such a revolutionary departure from the basic rates of pay, rules and regulations of working conditions which have been the goal of organized railway labor for many years, that to accept the K. C. S. plan would be, in so far as the railroads involved here are concerned, a complete breakdown of the many years of efforts of organized railway labor and would be and become an opening wedge towards the ultimate breakdown of these conditions upon all the other railroads in this country, and with the sincerity of this purpose so evident in the course of this hearing, the Board does not believe the K. C. S. plan as proposed will, in any event, be accepted by the organizations involved herein.

We are of the further opinion that if the controversy over whether or not the rules affecting seniority rights should or should not be contained in the working contract between the carrier and its employees were the only bone of contention, that that matter could be easily adjusted in view of the fact the carrier has expressed its willingness to incorporate such seniority rules in the contract. However, the seniority rules are but a small part of all the rules and working conditions contained in the old contract, which rules and working conditions the carrier seeks to modify and in some instances eliminate entirely, and which the employees are insisting on being incorporated in any contract between the carrier and its employees. Respectfully submitted this 12th day of July, 1933.

Following are additional extracts from the report:

The Carrier's Reasons For the New Plan

The carrier contends that the old contracts are very complex and complicated, difficult to interpret and apply, and contain a large number of provisions which prevent a reasonable use of the services of the said employees, and require the payment, for certain services rendered, of compensation at penal or arbitrary rates of pay; that the provisions of the said contracts, on account of their complexity and ambiguous wording, give rise to a great many disputes the settlement of which requires a large amount of time on the part of the employees and their representatives and of the representatives of the carrier, and are a serious obstacle to the harmony and co-operation which must exist between employer and employee if the highest efficiency and morale are to be obtained; that the penalities and arbitrary charges for services rendered provided by the said rules, are so heavy as to prevent the carrier from doing many things which ought to be done in operating its property economically and efficiently and in performing services for its patrons.

The carrier introduced testimony tending to show that the competition of other forms of transportation, viz., motor trucks, motor buses, pipe lines, and steamboats and barges operated through the Panama canal and over improved inland waterways, has attained large proportions since 1910, and that contemporaneously with such development, the increase in business, on the railroads, of about 85 per cent in each ten-year period, on which the railroads could formerly rely, had in the period from 1920 to 1929 almost ceased, so that during that period the increase in revenue freight traffic, measured in ton-miles, was only 8.5 per cent. Passenger traffic during the same period decreased 34.2 per cent. There has been a great decline in traffic since 1929, due to the above causes as well as to the depression. The trend of traffic on the line of the carrier was substantially the same as on the railroads generally.

The carrier contends that a very serious condition confronts the railroads, and that it is imperative that the restrictive rules and heavy penalties, in the existing schedules, be done away with in order that its operation and service may be made more flexible, so as to enable it to compete on more equal terms with the new forms of transportation, as well as to enable it to meet conditions brought about by the depression.

Objections of the Employees

It is the contention of the employees that the old contracts containing the schedule of rates of pay, rules and working conditions is substantially the same as the contract in force and effect on practically every other railroad in the United States, and that such rates of pay, rules and regulations of working conditions are the net result of more than sixty years effort on the part of organized railroad labor to bring about rules, working conditions and rates of pay that would in a fair measure guarantee to the employees of this and other carriers a fair return for their services and guarantee to them humane working conditions. The employees further contended that the proposed K. C. S. plan guaranteed none of the rules, working conditions and rates of pay as contained in the old contract, and that the promulgation of the proposed K. C. S. plan would, in effect, cause railway labor to revert to the chaotic labor conditions that existed prior to the promulgation of the standard rules and regulations contained in their old contract, that the proposed K. C. S. plan would likewise amount to a reduction in pay for said employees. The employees contend, further, that the carrier's endeavor to execute a separate contract with the different organizations of employees in an attempt by the carrier

to separate such organizations and to deny to them the right of collective bargaining.

After hearing the evidence presented by all the parties affected herein and after argument thereon, the board reports the finding of the following facts, and inasmuch as the proposed K. C. S. plan affects both engineers and conductors, whose rules, rates of pay and working conditions are not identical, they will be treated herein separately.

(a) Engineers

By the terms of the old contract engineers are paid for piece work, on the basis of eight hours or less, 100 miles or less, whichever produces the greater return, and which constitutes a basic day, with overtime to be paid at a punitive rate of one and one-half times the basic rate. The old contract also provides for severe penalties for infringement of different classes of crews upon work allotted to other crews and other classes of railroad labor. In like manner the rules contained in the old contract, numbering some 236 sections or rules, define every class and nature of service properly allotted to the different classes of crews, and provide prohibitive penalties against the carrier for violation of those rules. Such contract further provides for different rates of pay for operating different classes of engines. Rules governing the acquisition and control of seniority among employees are a part of the old contract.

The board further finds that the rules governing rates of pay, wherein eight hours or less, 100 miles or less, is considered a basic day, are a result of conditions which brought about and produced the Adamson Act, which Act, in part provides that:

"Eight hours shall, in contracts for labor and service, be deemed a day's work, and the measure or standard of a day's work for the purpose of reckoning the compensation for services of employees who now or may hereafter be employed by any common carrier by railroad." (U. S. Code, 1926, Title 45, Sec. 65.)

Following the enactment of the Adamson Act, the Director General of Railroads in 1919, while he was operating all of the railroads in the United States except a few short lines, put in effect an order that in passenger service 100 miles or less, five hours or less, should constitute a day's work for enginemen and that in freight service 100 miles or less, eight hours or less, should constitute a day's work, the difference in hours being arrived at under the assumption that it will take a passenger train five hours to run 100 miles at an average speed of 20 miles an hour, and that it will take a freight train eight hours to run 100 miles at an average speed of 12½ miles per hour.

This basic day has been continued in force by contract upon the carrier's lines involved herein, as well as upon almost every other railroad line in the United States, since their return to company operation

The difference in pay for different weight engines is the direct result of carrier installation of some large type engines, designed to materially increase train tonnage, and the practical application of the theory that the engineer is entitled to a part of his increased productivity

The necessity for rules governing seniority being a part of the contract rights is a result of carriers in the past having at time ignored seniority rules and regulations as promulgated by the railway labor organizations.

(b) Conductors

By the terms of the old contract conductors are paid for different classes of service at different rates of pay, the basic rate of pay being, in regular passenger service, 150 miles or less, 7½ hours or less, in freight service 100 miles or less, eight hours or less, constituting a basic day. This basic day was founded on the assumption that a passenger train will run on the average at a speed of 20 miles per hour, a freight train at 12½ miles per hour. In addition to such basic day pay, the old contract provides for the payment of a punitive rate of time and one-half for overtime in excess of the basic day.

This basic day was established by the Director General in 1919, and has been continued in force by contract between this carrier and its conductors much in the same manner that it has been continued in force on practically every other railroad in the United States.

The old contract contained many rules and regulations covering almost every conceivable contingency in working conditions, seniority rights and general and special duties regulating the conduct in service of such conductors.

The carrier in its proposed K. C. S. plan has offered to the engineers a separate contract, containing twelve sections, and in lieu of the present existing basic day of eight hours or less, 100 miles or less, as a basic rate of pay, the K. C. S. plan provides for a minimum allowance for the first three hours service or less in passenger service, with a straight hourly allowance for all time in excess of the first three hours. In other road service a minimum allowance is provided for the first four hours service or less, and a straight hourly allowance for all time in excess of the first four hours. For engineers in yard service a minimum allowance is made for the first six hours service or less, with a straight hourly rate for each additional hour. For service on the Arkansas Western Railway the K. C. S. plan provides that engineers are to be paid 80 per cent of the rates given to engineers on the other lines involved herein.

The remaining parts of the carrier's proposed contract do not contain most of the rules and working conditions set out in the old contract and eliminate the payment of all arbitraries, punitive overtime and compensation provided in the old contract for violation of rules prohibiting the infringement of one class of service upon another, and seek only to provide for a broad operating privilege that contemplates the payment for actual time in service, regardless of the nature of duties required of the employee by the carrier.

The carrier has offered a contract for conductors containing twelve sections, which in many respects is similar to that offered the engineers, providing for trip rates for regular passenger service and a minimum allowance for the first three hours or less in extra passenger service, with a straight hourly rate for all time in excess of the first three hours, and in other classes of service a minimum allowance for the first four hours or less, with a straight hourly allowance for all time in excess of the first four hours.

This contract likewise provides that on the Arkansas Western Railway conductors shall receive 80 per cent of the allowances for like service on the other roads involved herein.

This contract, like the one proposed to the engineers, does not contain the vast number of rules governing the rates of pay and working conditions and the penalties contained in the old contract for violation of such rules by the carrier.

The carrier involved herein operates a north and south road from Kansas City, Missouri, to the Gulf of Mexico, its Gulf terminal being Port Arthur, Texas, and consists of 882.81 miles of main line trackage. There are approximately 75 conductors and 122 engineers at present employed on the property. The strike vote taken was participated in by engineers, conductors, firemen, hostlers, trainmen and yardmen, the testimony of the employees showing that 550 strike ballots were voted, with 548 voting to strike and two voting to not strike. There is a controversy as to the number of men employed in all of these branches at the time said ballot was taken, and the Board is of the opinion that there are approximately 500 men involved in the strike ballot.

The statement of the carrier shows that the gross railroad operating revenues were as follows:

1929	$21,978,222
1930	19,096,694
1931	14,073,410
1932	9,875,437

And its not income or deficit, after the payment of taxes, fixed charges, etc., were as follows:

1929	$3,365,219, income
1930	1,466,610, income
1931	376,297, income
1932	1,380,759, deficit.

That, on the other hand, railway operating expenses for the same period were as follows:

1929	$14,275,415
1930	13,120,199
1931	9,546,379
1932	7,411,816

Findings of the Board

The board further finds that under recent operations there would have been some difference in the income received by the individual conductors and engineers as paid under the old contracts or as they would have been paid had the K. C. S. proposed schedule of pay been in effect. In comparison of what the individual conductors and engineers actually received for services performed for the first four months of 1933 and what they would have been paid for the same service performed under the proposed K. C. S. plan, the result would have been a net increase for conductors as a class of from 11 to 15 per cent and for engineers as a class a net increase of approximately 5 per cent.

The restrictive rules and regulations above referred to, and of which the carrier complains and which the employees are very jealous of their rights thereunder, are enforced by heavy penalties, which are inflicted for the purpose of compelling the carrier to give a certain kind of work to switching crews and other kinds of work to crews on certain road trains, that is, local freight trains, through freight trains, etc. To illustrate, for example, if under certain conditions the members of a road

crew are required to do a few minutes switching in order to expedite the movement of a train or to set out a car needed by a shipper, the carrier must pay four hours extra pay in some cases and a day's extra pay in others. If a switching crew handles a car out on the main line, it receives an extra day's pay for one or two hours work. It clearly appears that the employees do not claim they are entitled to these payments as reasonable compensation for the work involved, but that the amounts of the penalties are purposely made very large for the purpose of preventing the carrier from requiring such work to be done; and it has accomplished its purpose to a very great degree in that respect.

The result of these rules has been to interfere seriously with the most practical and economical operation of the railroad and the rendering of reasonable service to its patrons. This condition has been aggravated by a falling off of the traffic, on account of the depression and the rapidly growing competition of the unregulated trucks and other means of transportation.

It has been necessary for the carrier, on account of the decline in business, to reduce the number of switching crews at a considerable number of points to only one crew working about eight hours or to take off the switching crews entirely. The rules under these conditions cause material delay to the operations of the carrier and the service to shippers, unless the carrier incurs the penalties referred to. These penalties, as already stated, are so heavy as to prevent the carrier from incurring them except where it cannot possibly be avoided and it was clearly demonstrated that they prevent the most economical and efficient operation of the railroad and proper service to its patrons.

Railroads Not Under N. I. R. A.

WASHINGTON, D. C.

THE Railway Labor Executives' Association appealed unsuccessfully to President Roosevelt on August 18 to place the railroads and all classes of their employees under the terms of the national industrial recovery act for the purpose of increasing the number of jobs by shortening their hours and increasing wages. The President later disclosed the definite conviction that the recovery act itself cannot be applied to the railroads, because they are operated under an entirely different system, including the railway labor act, the interstate commerce act, and the emergency transportation act of 1933.

However, he took the position that it is entirely proper that the principle of the act should be applied. Instead of attempting to codify the railroads, therefore, he promised to consult with Co-ordinator Eastman to see what may be done to promote railway employment, and apparently the policy of the recovery act is to be used to nullify a part of the purpose of the emergency transportation act in so far as economies affecting employment are concerned. Mr. Eastman had already stated his opinion that some economies ought to be postponed as inconsistent with the purpose of the later act. He also had some time before urged the railway executives to do as much as possible to increase their employment and expenditures and had received reports showing that 65,000 men had been put back at work since June 1 but the labor leaders left with President Roosevelt a 60-page memorandum of instances in which they said railways had laid off men since the passage of the emergency act. This they still contend is in violation of the act, in spite of Mr. Eastman's interpretation that the prohibition against reducing the number in service in May applies only to action taken pursuant to the authority of the act.

Just how much the President meant to imply in stating that the principle of the N. I. R. A. could properly be applied to railroads was left uncertain. The general purpose is to increase employment and purchasing power. The labor organizations have been trying to use it to bring about very large increases in wages but railroad wage rates are now within 10 per cent of their peak and were never reduced as much as those in some industries. To some the principle of the act means a boycott of employers who may have so depleted their resources in trying to retain as many of their employees as possible that they are now unable to increase payrolls. To others it means an opportunity to increase prices and prevent selling below cost but any such principle in the act could have little application to the railroads, even under an order of the President, so long as their rates are under the jurisdiction of the Interstate Commerce Commission.

Mr. Eastman later indicated to newspaper men that the President had not taken the subject up with him before his departure from Washington on Saturday but might send him a communication. He said that there was no authority under the act administered by him to do what the labor organizations had asked.

Asserting that the public is wondering why the Blue Eagle is not appearing on the railroads and that it ought to be in every car, shop, and station, a special committee of the Railway Labor Executives' Association called on the President to urge him to require the railroads to submit a code to the N. R. A., or, if they fail to do so, to prescribe a code for them on his own motion, providing for shorter hours. They submitted a memorandum argument as to the jurisdiction and power of the President to do so under the national industrial recovery act, saying that it applies to "any industry" and that there is nothing inconsistent with the emergency act in such an application of the N. I. R. A.

On behalf of the 21 railroad labor organizations a formal complaint was filed with the President stating that "abuses inimical to the public and contrary to the policy" of the national industrial recovery act "are prevalent in the railroad industry and in many of its branches and subdivisions" and asking that such steps be taken as may seem proper "to the end that a code of fair competition for such railroad industry be established."

The committee consisted of A. F. Whitney, president of the Brotherhood of Railroad Trainmen, J. A. Phillips, assistant grand chief of the Order of Railway Conductors, D. B. Robertson, president of the Brotherhood of Locomotive Firemen and Enginemen, B. M. Jewell, president of the railroad department of the American Federation of Labor, and J. H. Lang, vice-president of the Brotherhood of Railway Clerks.

Labor Organizations Complain to President

Mr. Whitney also left with the President a letter complaining because the railroads had challenged the recent ruling of Co-ordinator Eastman as to his right to require payment to employees of the Boston & Maine and Maine Central who had been transferred from Boston to Portland, Maine, and from Portland to Boston, entirely independent of the co-ordinator law, for their property losses and expenses suffered by reason of the transfer. He stated that the carriers now propose to take action in the courts and that their action "is entirely contrary to that spirit of fairness and co-operation which should obtain in the existing circumstances." The President was asked to "use such means as you believe proper that justice may be done to the employees affected."

Representatives of the railroads have conferred with Co-ordinator Eastman and his assistants with a view to making a test case after the co-ordinator's representatives have completed their investigation and determination of the property loss and expense and the first order has been issued.

After the conference with the President the railway

labor executives indicated a belief that the President would issue a statement later in the day, but none was forthcoming. Mr. Whitney told newspaper men that the railroads had been attempting to dodge all the provisions of the recovery act, whereas they should have been among the first industries to support the plan, and that some railroads had not even maintained the number of employees in May. Some railroads, he said, had become very active in reducing forces, which he called a violation of the emergency act as well as of the spirit of the government's program to increase employment. The railroads should do their part to bring the country back to prosperity, he said, and there should be no economies at the expense of the employees because the railroads could save "millions" by ceasing to maintain company unions as well as in many other ways.

Mr. Whitney made it plain that the labor organizations wanted a code applied to all classes of railway employees and said there would be no difficulty in applying reduced hours to train service employees in the same way the Adamson eight-hour law was applied, making six hours instead of eight hours the equivalent of 100 miles as the basis for a day's pay. The memorandum left with the President said the emergency transportation act was passed "primarily to permit of the consolidation of certain railway systems" but that it is apparent "that there is nothing therein inconsistent with the National Industrial Recovery Act and a code could be established and its workings and operation be no way inconsistent with the duties of the co-ordinator."

As to the reasons for the establishment of a code the statement continued:

There are approximately one million men now employed in railroad service. The number employed in normal times is 1,750,000. There are, therefore, approximately 750,000 unemployed railroad men in this country today. With other industries taking on additional employees and with the situation as it is known to exist, there is no question but that the other industries cannot absorb the unemployed railway men. In other words, if these 750,000 unemployed railway men are to get work they must get it largely on railroads.

This can be done only by providing for shorter hours of work. With the improvement of our economic and business conditions, which is anticipated, there will naturally be some gain in employment. With modern transportation facilities, however, with the introduction of the machine, with economies which have been put into effect, the extra employment which better business will bring about will be insufficient to put the majority of these idle men back to work.

There are abuses prevalent in the industry. Some employees have been for months putting in considerable over-time. This is a condition which should not obtain. In this time of stress employees should not be permitted to work over-time. This condition cannot be remedied by voluntary agreements but can only be reached through the provisions of a Code adopted under the National Industrial Recovery Act.

Railway employees have received no benefit from the National Industrial Recovery Act. Their hours of work have not been lessened, their rate of pay has not been increased. In other industries this has taken place but with railroad employees they stand today as they did before the passage of the National Industrial Recovery Act.

Thousands upon thousands of railway men could be employed by the simple device of shortening the hours of work as has been done in other industries.

Certain matters as to employment are covered by Section 7 ("B") of the Emergency Railroad Transportation Act but that Act does not touch the matter of employment generally nor does it give the co-ordinator power to establish Codes similar to the power given the President under the National Industrial Recovery Act.

The right of employees to join labor organizations of their own choosing has been questioned by certain of the railroads and discipline has been meted out to some employees because of their activities along these lines. While such conduct on the part of the carriers is prohibited by law, a Code embodying the provisions of the statute and enlarging upon the same, if necessary, would doubtless result in preventing such abuses. The same thing applies to the so-called company unions.

Co-ordinator Studies Pooling, Standards, Research

WASHINGTON, D. C.

THE general objective of the Section of Purchases in the organization of the federal co-ordinator of transportation is elimination of avoidable waste in the purchase and application of railway materials, equipment and supplies. Since it seems evident that standardization and simplification of physical units and methods will result in important economies, a large part of the work will be directed along these lines, particularly during the initial period, according to a statement prepared by R. H. Lockwood, director of the section, and issued by Co-ordinator Eastman.

Large Field for Saving

"The railroads, individually and through the American Railway Association, the statement says, have made substantial progress in standardizing many items, notably in connection with equipment which much be interchangeable in use. There is an even larger field for saving money through reduction in variety of types, dimensions, specifications, and other factors of items used by individual roads. A single road may accomplish substantial savings by reducing to a minimum the variety of items bought, but if other roads use different standards for similar items, the general situation is as complicated as though each road bought every type and size of each item. Simplification, meaning elimination of unnecessary and immaterial differences in similar items, will in most cases result in direct savings in first cost, and in numerous indirect savings in handling and application."

The Section of Purchases is undertaking a detailed survey of existing A. R. A. standards, together with a general survey of standards for similar items developed by individual roads, by equipment and supply manufacturers, and by such other organizations as have developed standards for items used wholly or in part by railroads. These surveys are expected to develop information regarding adherence to existing standards, and to point the way toward full utilization of such standards as appear important. Information regarding new standardization and simplification projects will also be developed from the same sources. In the case of both current and new standards the Section of Purchases expects to provide means whereby each one can be reviewed at regular periods; reaffirmed, if no change appears desirable, and modified or revised, when necessary to meet changed conditions.

So far as possible, this work will be carried on in close co-operation with organized committees of the American Railway Association, particularly in the Mechanical and Purchases and Stores Divisions, and the American Railway Engineering Association. These committees will be asked to develop all technical information required in formulating projects, and will be called upon for suggestions regarding new projects. Each existing or suggested project will be analyzed to determine its probable value in terms of direct and indirect savings to the railroads. The Section of Purchases will also endeavor to co-ordinate the work of all organizations engaged in standardization in this field, in order that unnecessary duplication may be avoided. It seems probable that the establishment of a minimum number of specifications, dimensional standards, and standards of performance will be of major importance in approaching the many difficult problems involved in railroad purchasing.

A study of existing research organizations is being undertaken, with a view to determining the advantages of better co-ordination in such work. The possibility of establishing a central research organization is being studied. Such an organization would not only co-ordinate research work now going on, but might also be charged with the duty of investigating new products, devices and methods, establishing uniform practices for inspection and testing, and initiating research in new fields of potential value to the railroads. The experience of the largest manufacturing

industries shows that such research organizations pay large dividends.

Pooling of Facilities and Services

The co-ordinator announced on August 21 that he had received communications from the carriers' Regional Co-ordinating Committees which indicate that they will co-operate in his expressed desire that they should assume charge of the survey which the carriers in each region are collectively undertaking with a view to ascertaining the economies which are possible through unification or joint use of facilities and the consolidation or pooling of traffic or services.

The secretary of the eastern committee wrote:

I have been instructed to advise you that the Co-ordinating Committee will take immediate steps to bring about, as soon as practicable, the reorganization of the General Committee and other related committees, so as to bring their activities under the Co-ordinating Committee.

The secretary of the western committee wrote:

The Western Co-ordinating Committee will, as soon as practicable, organize the Waste Prevention and other related committees so as to bring these activities under the Co-ordinating Committee.

The secretary of the southern committee wrote:

The Committee directs me to advise you that they will carry out the request and suggestions of the co-ordinator in said communication of August 7th as to procedure during this period of national emergency.

The southern committee, however, indicated that it differs with the co-ordinator in regard to what it believes to be his construction of the law.

The work of the Section of Car Pooling is largely limited in its initial stages to the development of current data respecting freight car condition, supply and movement, according to a statement prepared by O. C. Castle, director of the section. This study includes not only the assembling of some statistics, but also conferences with railroad officers directly concerned with the maintenance and operation of freight cars and with operators of private car lines whose interests may be affected by plans which will eventually be considered for a general or limited freight car pool.

"It is recognized that car pooling has been a controversial subject for many years," the statement says. "Freight car pooling has been advocated periodically and many concrete plans have been proposed, investigated and consistently rejected by the railroads. With such a record of successful opposition it is obvious that there are some valid and practical objections to the car pool theory.

"Any revival of the proposition which ignores these objections is foredoomed to failure. The first task, therefore, with which the Section of Car Pooling is faced is to determine by a study of current conditions whether or not there are economies possible in the operation of freight cars under some form of pool.

"The second task is to develop the practical obstacles to the successful operation of a freight car pool, and to devise means to overcome them.

"The final step in the program, assuming the successful outcome of the initial studies, will be the adoption and inauguration of a workable plan for the freight car pool. This necessarily involves the collaboration of many minds and the utilization of existing railroad organizations to the fullest extent consistent with the change in methods of maintenance and distribution which a pool operation entails."

The statement continues:

In pursuance of the objects outlined in the foregoing, the Section of Car Pooling has asked the Car Service Division of the American Railway Association to secure current data covering the movement and interchange of box cars on the principal railroads and through the principal terminals in the United States. Information is also being secured from transportation officers directly, respecting methods which are in effect for partial pooling or other reciprocal methods now in effect between individual carriers for avoiding unnecessary empty car mileage.

Recalling the history of the car pool operated prior to and during Federal Control from 1918 to 1920, and appreciating that the essential defect in that experiment was the failure of any adequate provision for maintenance, a special study of that important feature is under way. Railroad mechanical officers whose experience and standing recommend them as competent to advise on this feature, are being invited to come to Washington for conference on the possibilities of a pooling of car repairs.

As directly related to the maintenance item, the existence of large numbers of obsolete or non-productive equipment is being considered and an investigation is under way looking to the immediate retirement of such equipment. As a further step toward uniformity in design and condition of interchange freight cars, railroads are being asked to give consideration to a plan for restricting certain classes of cars to the lines of their owners.

One class of equipment which seems to offer opportunities for a more centralized control is the Refrigerator Car. The views of the management of refrigerator car companies respecting the possibility of a refrigerator car pool are being developed and a thorough study of this particular phase is being undertaken.

The use of privately-owned cars and the rentals paid therefor are under consideration by the Commission in Ex Parte 104, Part 5, and I. & S. No. 3887, extensive hearings in which have recently been held in Chicago. These hearings were followed, and the evidence taken therein is being studied by the Section of Car Pooling with a view to considering possible action by the co-ordinator with reference to these matters.

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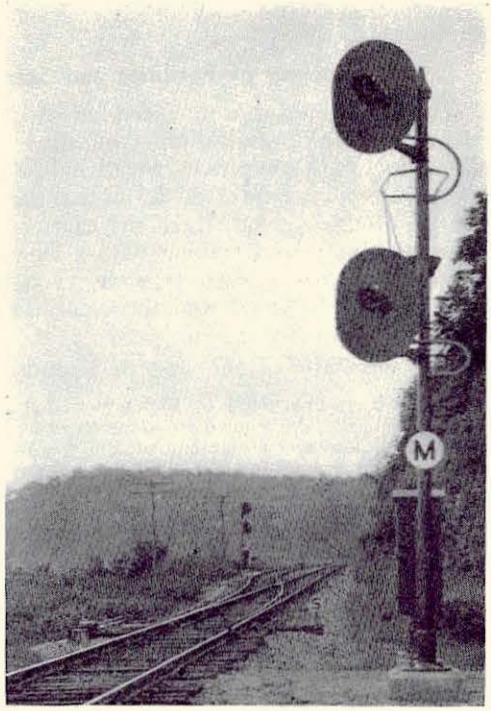
Manual-Block Installation Includes Spring Switch on C. & O.

Interlocking replaced, protection extended and train operation improved—Switch mechanically locked



Signal 1L Is 50 Ft. from the Spring Switch

THE James River line of the Chesapeake & Ohio, which extends from Richmond, Va., to Clifton Forge, a distance of 229 miles, is divided into two subdivisions with the intermediate terminus at Gladstone, 119 miles west of Richmond. The line is mostly single track with short sections of double track west from Richmond, east and west of Gladstone and east of Clifton Forge, with two other short sections between Gladstone and Clifton Forge. East from Gladstone the double track extends to Greenway, a distance of 5 miles. When this track was built, several years ago, a 20-lever mechanical interlocking machine was installed at Greenway to operate the switch and the signals at the end of double track, as well as a crossover between the main track and a passing siding, the interlocking tower also serving as a manual block station. No automatic block signals are in service on the subdivision between Richmond and Gladstone except on the eight-mile section of double track between Richmond and Westham.

Average Daily Traffic

The average daily traffic on this subdivision consists of 4 passenger trains, 2 local freights, 4 manifest freights, and from 4 to 6 extra freights, totaling from 14 to 16 trains daily. A large part of the tonnage handled over this line is coal, which is being moved from the West Virginia and Kentucky fields east to tidewater at Newport News, and is handled in trains of 150 to 160 cars each. The dispatching is arranged so that the majority of the eastward tonnage trains make the run from Gladstone to Richmond without stopping, and as the line is on a river grade descending about 3 ft. to the mile, these runs are made in from 6 to 7 hours. The important problem in operating such trains is to eliminate, so far as possible, all conditions requiring the application of the brakes, for if the engineman applies them, it is usually necessary to complete the stop to prevent the possibility of pulling the train in two. This point is mentioned here because of its importance in connection with the installation of spring switches and signaling.

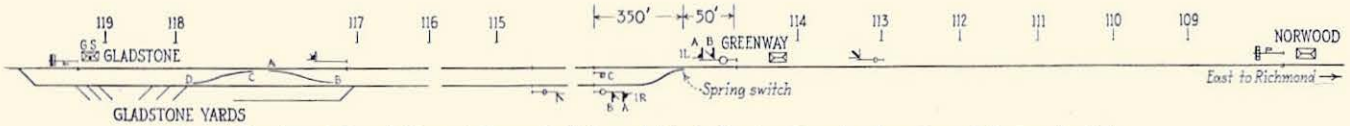
In normal operation all trains use the right-hand track on the double track between Gladstone and Greenway. As a means of improving train operation, as well as of reducing operating expenses, by eliminating the interlocking at Greenway, it was decided early in 1932 to install a spring switch at the end of double track, to abandon the crossover leading to the siding as the siding was no longer used, and to change the system of signaling to provide for remote-control manual-block operation, the control levers being located in the block office at Gladstone. On December 17, 1932, the installation was placed in service and the old interlocking was dismantled.

This new installation of signals and spring switch cost approximately $11,000 complete, and the annual savings in operating expenses effected by the elimination of the interlocking at Greenway amount to approximately $5,000, which is equivalent to a return of 45 per cent on the total cost. Consideration should also be given to the fact that the new signaling affords certain additional safety features, as explained elsewhere.

Mechanical Facing-Point Lock

An outstanding feature of the spring-switch arrangement is the use of a mechanically-operated facing-point lock. Normally, the switch points are locked the same as an interlocked switch and no speed restriction is placed on westward trains approaching the facing point. This is, of course, the principal advantage of the locking arrangement. The speed of eastward trains is limited only to that ordinarily required for a No. 16 turnout, which is approximately 30 m.p.h.

The mechanical facing-point lock is a new develop-



Track and Signal Plan of Controlled Manual Block Section Showing Location of Spring Switch

ment, and this installation is one of the first twelve to be placed in regular service. The main unit of this apparatus includes the Type-T-10 hand-operated switch mechanism. The switch can, therefore, be operated when necessary by hand, the same as any ordinary hand-operated switch.

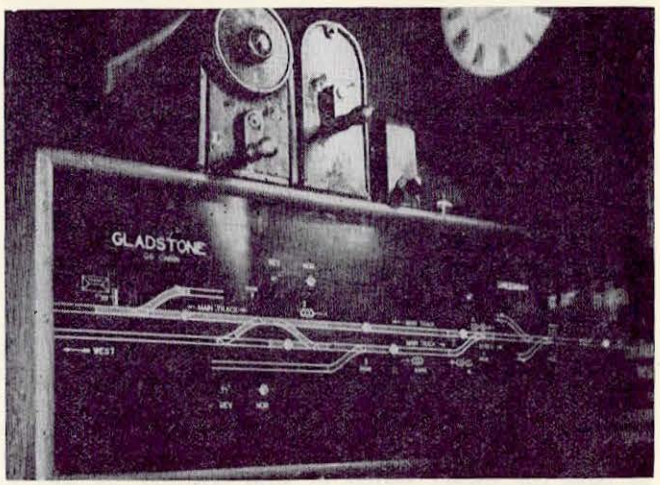
When a trailing movement is being made through the spring switch, the front wheels of the pony truck of the locomotive cause a deflection of approximately 5/8-in. in the switch points about midway between the heel and the point. This deflection takes place before the switch point starts to open, and, with the locking plunger operated by a pipe connection attached to the switch point rails at the location where maximum deflection is obtained, the plunger is withdrawn before the switch point starts to leave the stock rail. As the train proceeds, the switch is opened against spring pressure and is prevented from slapping back and forth between the wheels by an oil dash-pot. After the rear of the train passes through the switch, the points gradually close and are again automatically locked. The circuits for the control of the signals are so arranged that if for any reason the locking plunger is not properly adjusted or the switch points are not locked, the signals governing movements over the switch will indicate "Stop". The operating rules require the switch to be examined to insure its being in proper condition before movements are made over it, if for any reason a proceed indication cannot be given on the signal governing movements over the switch. The spring switch, including the spring and oil cylinder buffer, is in one unit.

Track Construction Important

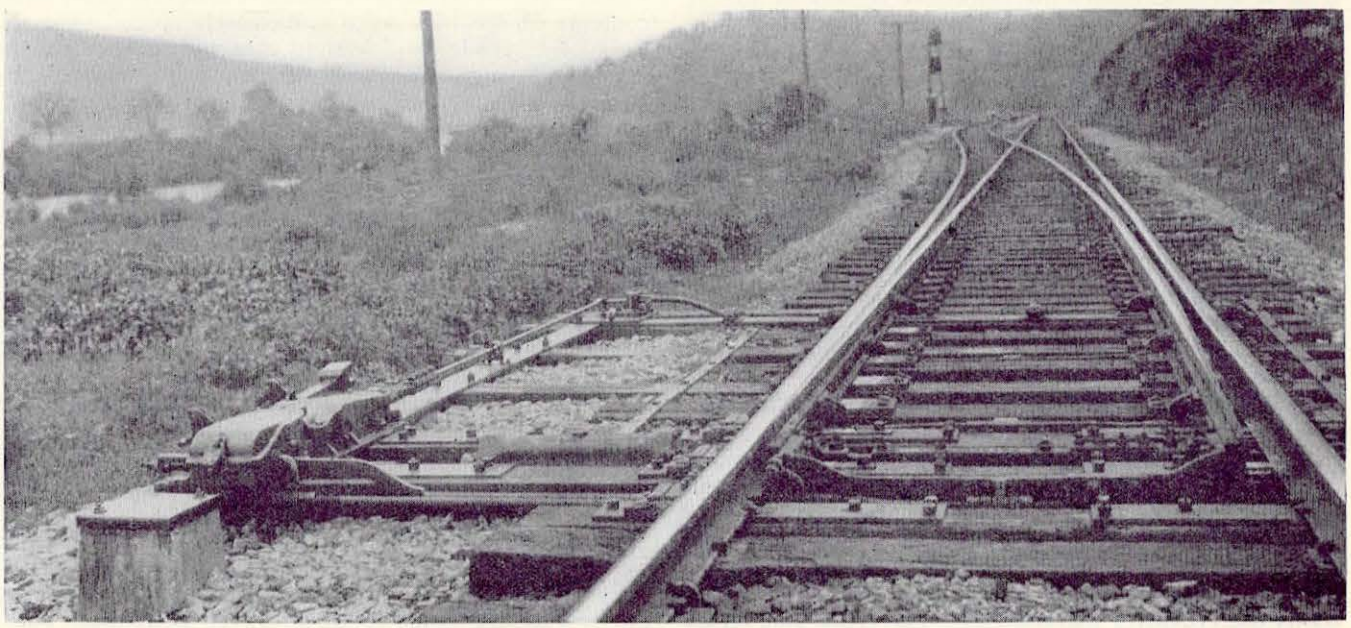
The track throughout this territory is constructed with 100 lb. A.R.A. section rail, the turnout at the end of double track at Greenway being No. 16. When the spring switch was installed, the old 30-ft. switch points were replaced with reinforced switch points of the same length, the reinforcement being 1¼ in. thick and extending throughout the entire length of the rail. This reinforcement reduces the springing of the points and is considered essential for successful operation with spring-switch equipment. In order to prevent rolling or canting of the points, three heavily-braced head-rods were installed. The spring switch location is designated by a marker, consisting of a metal disk with a black letter "S" on a white background, which is placed on the end of a tie so as to be seen plainly by trains approaching the spring switch in either direction.

Signal Protection

The signaling at the end of the double track layout at Greenway consists of two, two-unit high signals, one governing westward facing-point movements and the other eastward trailing point movements over the switch, and a dwarf signal for governing reverse movements on the westward main track. Three-position distant signals are located approximately 5,000 ft. in advance. In addition to checking the position of the switch and the locking plunger, the two-unit signals—the control levers for which are located in the office at Gladstone—are semi-automatically controlled over the track circuit within the home-signal limits, and are also controlled over track



The Track Diagram and Control Levers in the Gladstone Office



The Spring Switch Layout Includes Adequate Bracing and Plates

circuits extending through the limits of the manual block section.

As shown in one of the illustrations, these high signals are designated as manual block signals by a white circular disk 12 in. in diameter, on which is painted a black letter "M", the disk being mounted on the signal mast below the bottom unit. The aspects and indications of these signals are as follows: Red over red—Stop; red over yellow—Permissive Manual Block; green over red —Clear Manual Block. When a train encounters a "Stop" indication, the conductor or engineman is required to call the operator on the telephone for instructions, a telephone being located at each manual block signal.

In the Gladstone office, an illuminated track diagram and two levers are mounted above the operator's table. When the push button is operated in addition to the lever, the signal will display a "clear-block" indication, provided the block is clear. Reverse movements on the double track section are made only in case of emergency, and then only on train orders. In the case of a reverse movement from the single track to the eastward main track from Greenway to Gladstone, a train will stop at signal 1L until a trainman has reversed the switch with the hand-throw switch lever. After the train has passed, the trainman returns the switch to normal position. The dwarf signal is inoperative. When a reverse movement is made on the westward main track from Gladstone to Greenway the trainman must, before entering the single track, obtain permission from the operator at Gladstone to pass the dwarf signal in stop position, as well as obtain information on the condition of the block in advance.

When the operator is ready to set up a westward movement through Greenway, he operates lever No. 1 to the left while for an eastward movement this lever is operated to the right. The movement of the lever to the L or R position causes the respective signals to display permissive block indications. It will be noted that track circuits are provided through the entire length of the two blocks from Gladstone to Norwood. These are necessary in order to OS trains automatically and also to insure against the display of a clear block indication unless the block is clear. In these two respects the new system is superior to the previous arrangement with a block office at Greenway.

Special Signal at Gladstone

In addition to several other yard switches, crossovers marked AB and CD at the east end of Gladstone Yard are hand-operated by a switchman, on instructions by telephone from the operator at Gladstone. A loud-ringing bell near the switchman's shanty serves the purpose of announcing the approach of westward trains on the westward main track from Greenway. The position of crossovers is indicated on the operator's track diagram by the operation of a push button, so that he may know when the switches are properly lined for the various train movements.

When entering Gladstone Yard, all westward freight trains use crossover marked CD. Therefore, this crossover is normally lined for this movement. Eastward passenger trains, after making the station stop at Gladstone, operate over the single track to the east end of the yard, thence through crossover AB to the eastward main track. The westward signal, which is located near these crossovers, affords a means for the operator to stop a westward freight train at that point in case he is ready to let an eastward passenger train go before letting the freight pull into the yard. This signal is controlled by a separate lever. Thus it will be seen that the operator has complete control of all trains moving in the two manual block sections between Gladstone and Norwood. This arrangement has greatly assisted in moving trains into and out of the Gladstone terminal.

This entire installation was designed and installed by signal forces on the Chesapeake & Ohio, the signals, relays and auxiliary apparatus being furnished by various manufacturers.

Oil Truck Wrecks at Crossings are Numerous

AMONG the recent train-accident reports issued by the Bureau of Safety of the Interstate Commerce Commission is a case (No. 1829, St. Elmo, Ill.), in which a fast train struck an automobile tank truck at a crossing, resulting in three deaths, wherein the salient feature was the almost incredible carelessness of the driver, and the irresponsible ownership of the truck, the driver having been a young man of 19, without a license, and apparently with a minimum sense of the responsibility required in the circumstances. A feature of this report is the absence of extended comment on this peculiar danger—the transportation of gasoline on the highway—but this is perhaps because of the repeated (but apparently ineffective) appeals on this subject which have already been issued by the Bureau, as noted below.

The train involved in the St. Elmo case was westbound passenger No. 19, of the Pennsylvania; locomotive 1433 and ten cars, moving at 65 or 70 miles an hour. It struck the truck at a crossing about 100 ft. west of the station. The truck, approaching from the south, was moving at less than three miles an hour. The contents of the tank were immediately spread over the locomotive, tender and leading cars and at once caught fire. The engineman and fireman were burned, the latter fatally; the two persons on the truck were killed, and two trespassers were injured.

The report gives the following details: The railroad line is practically straight and level and the view from the highway is ample, except that for a short distance just before reaching the track it is restricted by the station building. A train can be seen 500 ft. away when the wayfarer is 45 ft. distant, and for two miles just before crossing the track. The crossing has the usual sign and also flashing red lights, set 7½-ft. above the ground. The accident occurred at 5:45 p. m. (from 7:30 a. m. to 4:30 p. m. there is a watchman on duty and the automatic flashing lights have the electric current cut off).

The truck, operated by E. W. Gibbons, owner of a garage and agent for an oil company, was being driven by Van Lee Smith, a filling-station attendant. He had leave to use the truck in going to his home, and was on his way home. He stopped about 36 ft. south of the crossing to take on his young brother, 9 years old. Then, while moving very slowly a man (apparently a friend) jumped on the righthand running-board, and placing his head and shoulders inside the cab, spoke to the driver, (perhaps taking his attention from the oncoming train). This man succeeded in jumping off just before the collision. A part of the truck was carried about 400 ft. on the front of the locomotive, and the train continued 4,400 ft. before it was stopped. No part of the train was derailed, but the engine and several cars were badly

scorched and damaged. Neither engineman nor fireman was able to make a statement. Witnesses said that the stop of the truck before crossing lasted a minute or two. The locomotive whistle had been properly sounded, and, also several short blasts as a warning were sounded when, evidently, it was too late.

Van Lee Smith had been employed at the filling station about ten months and had driven Mr. Gibbons's private automobile. There was evidence that Smith saw the train, possibly a few seconds before it struck his truck, but Goodwin, the man who jumped on the running-board (the only survivor), refused to make any formal statement.

Previous Cases

A similar case occurred at Moark, Ark., on the Missouri Pacific, on April 20, which appears in the Bureau's reports as No. 1821. The circumstances were in many respects similar to those at St. Elmo. The accident occurred at 7:13 a. m. The highway is one not heavily traveled and the only protection at the crossing is the regular cross-bar sign. There was a good view and the driver proceeded at about 10 or 15 miles an hour, apparently oblivious to the approach of the train. The driver was killed, the fireman of the locomotive was also killed, and the engineman injured; three other persons were injured. The train was moving at about 60 miles an hour, and the engineman had but a brief view of the truck, as it approached from the left side. The driver was a man 30 years of age, with a reputation as a careful driver and a man who attended soberly to his business. He was thoroughly familiar with the crossing.

The report narrates at considerable length the apparent indifference of the oil company for which the driver of the truck, E. E. Nelson, was agent. No limit is placed on the number of hours of service of drivers and some of them work on commission, so that longer hours are expected to produce better income. No effort was made to ascertain whether drivers have had proper rest and there was no rule requiring them to stop at crossings, though the State Highway Commission has promulgated such a rule. The district manager of the oil company was not familiar with any such law.

The report says that this was the second investigation of this character in Arkansas in less than a year. At Lowell, Ark., on June 2, a gasoline truck was run in front of a train without stopping, and three persons were killed. In this case no special instructions regarding safety had been issued to truck drivers, and no records of discipline or hours of service were kept. In its conclusion the report says, "It is high time that these matters received such attention as will eliminate the occurrence of accidents of this character; and if it is not accomplished by the persons directly engaged in transporting dangerous articles" proper legislation is necessary.

A notable accident of this kind which occurred at Richards, Ohio, on the New York Central, on May 8, 1931, was made the subject of a special illustrated report issued by the commission on July 27, of that year. The engineman, fireman and truck driver were killed. The report on this case listed seven accidents of the same class which had been investigated in the years 1922-1931, in which an aggregate of 29 persons were killed and 73 injured, these occurring in California, Minnesota, Michigan, Ohio, Oklahoma, and Utah. Besides the cases investigated, the records of the commission show that in the two years and three months ending April 1, 1931, no less than 52 crossing accidents of this class had been reported by the railroads.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended August 12 totalled 622,759 cars, an increase of 9,647 cars as compared with the preceding week following two weeks of reduced loading. As compared with the corresponding week of last year this was an increase of 110,794 cars but it was still 120,867 cars below the corresponding figure for 1931. All commodities except grain and grain products and livestock showed increases over the corresponding week of last year and all except l. c. l. merchandise, coke, and miscellaneous freight showed increases as compared with the week before. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week ended Saturday, August 12, 1933

Districts	1933	1932	1931
Eastern	138,001	112,752	160,145
Allegheny	130,825	96,045	144,473
Pocahontas	49,319	34,548	46,149
Southern	83,155	73,004	103,212
Northwestern	92,764	66,845	107,380
Central Western	81,327	85,153	115,595
Southwestern	47,368	43,618	66,672
Total Western Districts	221,459	195,616	289,647
Total All Roads	622,759	511,965	743,626
Commodities			
Grain and Grain Products	31,598	40,823	46,011
Live Stock	15,389	15,749	20,275
Coal	122,607	79,764	112,816
Coke	6,526	2,807	4,623
Forest Products	27,758	15,437	27,732
Ore	33,035	8,051	35,303
Mdse. L. C. L.	169,696	167,527	212,771
Miscellaneous	216,150	181,807	284,095
August 12	622,759	511,965	743,626
August 5	613,112	496,626	734,730
July 29	638,396	511,103	761,818
July 22	648,914	501,912	742,481
July 15	648,206	503,761	757,989
Cumulative total, 32 weeks	16,952,328	17,049,115	23,523,573

Car Loading in Canada

Car loadings in Canada for the week ended August 12 totaled 38,644, according to the compilation of the Dominion Bureau of Statistics, which was an increase over the previous week of 869 cars, and the index number rose from 63.34 to 67.10. August 7, observed as "civic holiday" in many municipalities, has had a greater effect in the eastern division than in the western division in past years, and its effect was evident this year also.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
August 12, 1933	38,644	19,141
August 5, 1933	37,775	20,322
July 29, 1933	37,131	19,902
August 13, 1932	39,152	15,444
Cumulative Totals for Canada:		
August 12, 1933	1,133,716	578,560
August 13, 1932	1,301,346	622,375
August 8, 1931	1,536,460	847,480

SIR W. GUY GRANET, G.B.E., a director of the London, Midland & Scottish and former general manager of the Midland Railway of Great Britain, has accepted an invitation from the Union of South Africa government to become chairman of a commission which will investigate the administration of South African railways and harbors. The commission is expected to commence its studies in November.

More Jobs in Private Enterprise Key to Revival

By a Cornfield Economist

SINCE first confronted with the necessity of making a living, man's chief concerns have been about food, shelter, clothing and the safety of self and family. Until modern times, these prime requisites of life have been available even moderately to but a small part of the human race. The present era of instantaneous communication, easy transportation and almost unlimited capacity for production makes it hard to get a mental picture of those days which are not far off as history goes. Under such conditions, civilized men developed a philosophy of life which finds expression in such sayings as: "Waste not, want not." "Save and have." "A penny saved is a penny made." Thrift meant that each man took in all he could and paid out as little as possible. Grandfather met underproduction with lessened consumption. We met overproduction in the same way, thereby increasing our difficulties and bringing about a series of vicious circles which resulted in industrial paralysis, mildly denominated by the chart-makers as a depression.

A way must be found to reconcile the old philosophy with the new and to avoid the meddlers and experimenters.

As an example of experimenting, take the case of the railroads. Everybody seems to know how to run the railroads except the men who are paid to manage them.

Now, the railroads represent an investment of twenty-five billions of dollars. Practically every savings account or insurance policy in the country is affected by their continued prosperity and solvency. Physically, the commerce of the country is dependent upon having them continue in business. These facts ought to be known to our lawmakers. Yet government has encouraged and promoted competing service by subsidies of many kinds.

The president of one of our large railroads stated recently that his line was probably the largest taxpayer in the United States. The item of taxes, at that, did not include millions spent for new stations demanded by civic pride, nor other millions spent for the elimination of grade-crossings. The latter is, no doubt, for the mutual protection of the autoist and of railroad property and safety, but the two classes of traffic are not treated equitably in dividing the expense.

These facts are recognized by fair-minded men, but because the railroad rates touch the daily life of everyone and enter so directly into price factors affecting the competition between business institutions and different communities, they receive more attention, more efforts to reduce, than do the charges of any other of the regulated utilities. There is always somebody trying to break down the railroad tariff, either by appeal to government or threats to divert to other carriers.

When the clouds gather in panic or depression or financial stress, the self-appointed experts—always ready with their weather-making devices—assemble and begin to tell what should be done to save the railroads. Eliminate competitive effort, they say. Force co-operation and remove duplications. Discharge the high-priced help. Do away with this department or that, but don't reduce wages.

What the railroad really needs is traffic. Under the old philosophy, which subscribed to the doctrine of a fair fight and no favor, it could take care of itself. Under the new philosophy, which to some means that the government is to manage all our affairs, the railway must be supported either directly by tariff charges or indirectly by government guaranties. Notwithstanding that they are supervised, regulated and restricted to an extent unknown in any other industry, the railroads compare favorably with the best managed of our institutions in efficiency and honesty.

The question naturally arises: If we as a nation are to return to the old philosophy and skimp and save and deny ourselves everything but the prime necessities, why must the railroad lead the van? Stern necessity due to regulated income and regulated outgo would seem to have squeezed about as much out of this industry as it should stand.

Official reports indicate that in 1920 the Class I railroads carried 2,022,832 persons on their payrolls. In December, 1931, this number had been reduced to 1,258,719, and in the spring of this year this total had fallen to 946,005. It may be regarded in some quarters as socialistic to suggest the retention in any industry of men not actually required to do necessary work, but one cannot help speculating as to how this army of a million men, separated from their employment, have adjusted themselves in this land of too much in such way as to enable them to obtain for themselves the necessities of life.

One of the proposals seriously put forward by one group in Washington as a panacea for railroad ills, and therefore a help for some serious banking troubles, set forth that the depression could be chased away so far as railroads were concerned by further consolidations and further reductions in personnel at a saving of $743,000,000 a year. Truly, the railroad is an inexhaustible field for exploitation on the part of the idealistic economists of the old school!

Why always the railroads? If putting our people out of employment wholesale is the cure for the depression and the price we must pay, why do not the doctors explore some really fertile fields? What, for example, is more wastefully distributed than gasoline? Every car driver wonders at the multiplicity of filling stations, the large number of tanks at each, and frequently at the grandeur and expensive locations of these stations. Real efficiency surely could release a million men from the drudgery of pumping gasoline if only we could have a czar to direct the consumer to a municipal centre for oil and gas. Carrying the great plan on to other trades and professions: Properly organized and co-ordinated, the most efficient third in any group could undoubtedly do the work now done by all.

We have had one fling at government management. In 1918 the director general took the railroads over and soon announced, in substance, that the possibilities of savings incident to consolidation, concentration and elimination of waste were so great that it would not be necessary to increase rates. Rising prices and wages slowly climbing since 1900 and accelerated by the World War, and which the Interstate Commerce Commission refused to recognize as any reason for raising the railroad rates adequately to permit their operation by private enterprise, brought about this experiment in centralization and government direction.

Mr. McAdoo, however, was forced to yield to the clamor for wage adjustments and also had to raise his rates very markedly to make even his operating expenses. The result of the experiment to the federal government was a loss of more than sixteen hundred million dollars. Following the end of this experimental period, the "brain trust" of that time put their heads together and

(Continued on page 318)

Motor Transport Section

How Provide Collection and Delivery Service?

British railways find substantial economies and other benefits are secured by operation of own trucks

By C. E. R. Sherrington
Secretary, Railway Research Service, London, Eng.

EVEN in the first decade of British railway history, one finds a close connection between the early railways and the road-transport firms of that period, which in some cases had a long history dating back to the mid-eighteenth century. Among the more important of these firms were Pickfords, who came to an agreement with the Liverpool & Manchester, the London & Birmingham and the Grand Junction railways, before these became the London & North Western Railway on its formation in 1846. In the 1860's, Carter Paterson & Co., another firm which is still well known in England, acted as agent for several of the larger railways. Until the coming of the internal-combustion-engined road vehicle, such co-ordination of rail and road service was natural, and there was little competition between the railways and the roads, since the activities of the latter were limited by the length of haul possible with horse-drawn vehicles. The coming of the motor vehicle, however, changed the whole situation quite radically, and by the end of 1923, the year in which the existing four great British railway companies were formed, each of them possessed an important number of road motor vehicles for collection and delivery of freight.

Prior to 1928, the railways, except in a few small areas, had no power to carry freight wholly by road, and their activities were confined to the collection and delivery of merchandise and so-called parcels traffic, which corresponds to express in the United States and is handled on passenger trains at passenger train rates.

Number of Motors and Horse-Carts Owned by the Four British Main Line Railway Companies in 1923

	Motors	*Horse-Carts*
Great Western	392	3,974
London, Midland & Scottish	1,357	19,432
London & North Eastern	198	6,989
Southern	140	1,932

"Mechanical Horses" and Trailers Loading at Saw-Tooth Platform of Manchester Freight Station, London & North Eastern

Double-Deck Sheep Truck, of the London & North Eastern

Since 1928, however, the railways have possessed full road powers on both the passenger and the freight side, though the former is outside the scope of this article. In practice, the British policy has been to take up shares in the large bus-operating companies already covering the country with a network of routes, and operating both express coach and local bus services.

Motor Fleets Rapidly Extended

On the freight side, the problem had to be tackled somewhat differently since no comparable widespread organization existed with which agreements could be arranged on a sufficiently wide scale. The British railways, therefore, are rapidly extending their own motor fleets, which today include tractors, motor lorries and so-called "mechanical horses" — in reality a form of three-wheeled tractor designed to replace horse traction, with a horse dray adjusted for this use—and they now possess a very large road transport fleet, as the following figures amply demonstrate:

Number of Motors and Horse-Carts Owned by the Four British Main Line Railway Companies in 1932

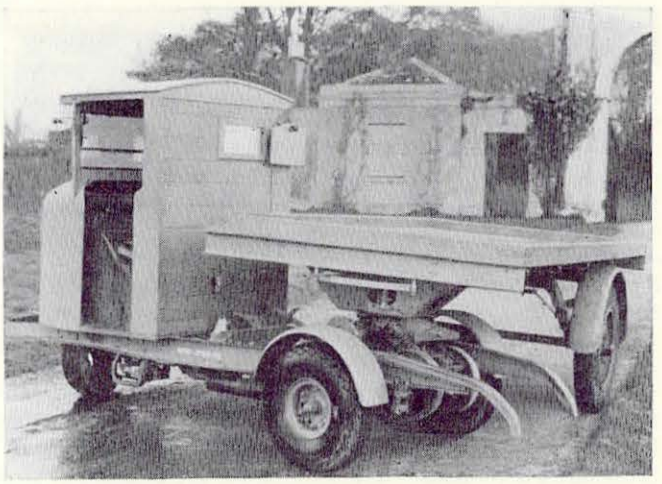
	Motors	*Horse-Carts*
Great Western	1,604	3,703
London, Midland & Scottish	1,952	16,672
London & North Eastern	1,615	7,679
Southern	430	1,407

The railways claim that they can now undertake virtually any type of haulage by rail or road, or preferably by combined rail and road service, whether it be furniture removals, farm products, livestock, construction materials, the machinery of mills or any other special work.

Movements which are undertaken wholly by road are kept separate, so far as accounting is concerned, from the road work undertaken in connection with the collection and delivery of merchandise carried by rail. It is with the latter question that this article is intended to deal, since the problem is of considerable importance to the American railroads at this time when policy is being designed in regard to the provision of store-door delivery by many important railways.

Advantageous to Operate Own Vehicles

The British railways have found it very much more satisfactory, in the majority of towns, to acquire and operate their own road transport vehicles, since it gives them the enormous advantage of complete control over the shipment throughout the transit from the consignor to the consignee. Criticism of this policy has been generally concentrated on three supposed objections. In the first place it is suggested that a railway road transport organization is not sufficiently localized to keep in close touch with the individual requirements, an argument which has little force in practice if the road transport vehicles are placed in the charge of the local responsible railway supervising officer. Secondly, it has been suggested that the railway work, being widely scattered and localized, cannot obtain the benefits of large-scale operating economies. This argument takes exactly the opposite point of view to the first one mentioned, but is not valid in practice because, judiciously organized, the benefits of large-scale maintenance and control can be obtained with a railway-operated fleet, in addition to the benefits derived from localized supervision. The third objection usually claims that a contractor can work his vehicle more economically because he can use his fleet for other work when not required for railway cartage. This argument is entirely fallacious, because it regards the traffic to be handled as static and of fixed volume, whereas the railway endeavors to increase its traffic to be collected and delivered. The contractor working on behalf of the railway has no great incentive to increase the amount of work handled for the railway at a fixed charge for himself of so much per ton; in fact, frequently it would pay him better to carry it throughout in his own vehicles.



London & North Eastern "Mechanical Horse" and Trailer

The railway, on the other hand, is obviously out to increase the volume.

Explained in figures, one may assume the amount paid to a contractor for collection and delivery service in a small town to be, say, £400 per annum. If his operating costs are £300, his profit will be £100. If the railway takes over the work with its own fleet, the operating costs may prove higher, and often do—let us place them at £450—but within a very little time, it has been found in almost every case, the traffic to be handled increases and the gross receipts from collection and delivery service would rise to £600, thus leaving a profit to the railway of over £100, since there would be no proportionate increase in operating costs.

Substantial Increases in Traffic

This is a typical result of the change-over in many cases, and so great has been the increase in traffic in many towns that the main problem has been to acquire sufficient new vehicles rapidly enough to meet the demand. Needless to say, the railway serving a wide territory is able to economize through the transfer of vehicles from one district to another, in the same sort of way as the employment of Pullman sleeping cars has eased the distribution and supply of such cars to meet peak movements to Maine, Florida, or the Pacific Coast of the United States. In Great Britain, such a policy

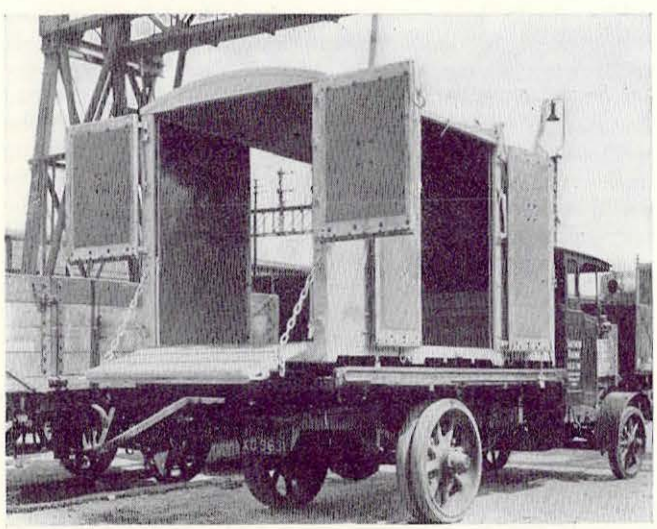
has been of great assistance at agricultural shows, for example. By transferring motor vehicles and other equipment from neighboring places, the railways concerned can undertake the whole of the cartage requirements without the excessive expense of hiring additional equipment. The consequent ability to offer complete transportation to and from the show is a powerful weapon in meeting the competition of the road carrier, and the fact that the cartage is in the hands of the railway company insures better co-ordination with the railway side.

In summary the problem which now faces the American railroads is one of policy formation of no mean importance, and it is likely that the experience of the British railways in regard to this matter may possibly prove a useful guide as to the best method to adopt. British methods cannot be transported wholesale to the United States, any more than American methods can be adopted in Great Britain without serious adjustment, but under British conditions the railways have found it profitable to take an increasingly important part in the collection and delivery of freight, one great advantage being the direct contact of railway staff, usually more highly paid than that of the contractor, with the consignor and consignee. Such contact tends to induce traffic to flow by rail, but it must not be thought that there are not still many contractors employed by the British railways for their collection and delivery work. Generally speaking, such cases are now limited to districts where special local circumstances are to be found or to places where long-term contracts are still in force.

Reason for "Unprofitable" Nature of Operations

The fact that the collection and delivery operations of the British railways have been shown by the accounts to be unprofitable has given rise to a certain amount of criticism. In 1932, the receipts of all railways in Great Britain, on account of collection and delivery, amounted to nearly £4,300,000 while expenditures exceeded the receipts by practically £1,000,000.

The major reason for this loss is the relatively low level of the amount included in the through rate covering collection and/or delivery. This amount has always been kept low deliberately, because, since it is the amount of rebate which is allowed in the case of traffic which is collected or delivered by the consignor or consignee, it has a very considerable effect on the intrusion of privately owned vehicles into stations. It has always been found best that such intrusion should be kept at a minimum because it consists invariably of single-direction working at peak periods. For example, if any number of private vehicles were working into a station, they would all come in empty the first thing in the morning to take traffic out of the station, and they would all come in loaded, the last thing at night, to bring traffic into the station. Such working in one direction is, of course, very disadvantageous to the most economical domestic operation of the station itself. The greater the traffic which the railway company handles by its collection and delivery service, the greater control it has over the working in both directions, and this is very desirable from the railway's point of view. In this way only can the happy medium be obtained between the complete working in one direction, which the shipper naturally desires, and the complete working in both directions which the railway company desires.



Container on Southern Railway Motor Truck

Rates Quoted for Complete Service

In calculating rates on traffic which is collected and/or delivered by the railway, the cartage rates are added to the station-to-station rates, thus giving a charge per ton covering the door-to-door movement. Where the weight of the shipment is only a fraction of a ton, as is often the case in Great Britain, the corresponding fraction is, broadly speaking, applied to the total rate, there being no fixed minimum charge per shipment for cartage operation, although a surcharge is payable when the total weight is under 336 lb. As a result, the sum accruing to the railway on account of the delivery of a particular small shipment may be the equivalent of only a few cents and quite insufficient to cover the costs. Insistence on a comparatively high minimum charge, however, would, under British conditions at least, where the average haul of all descriptions of freight is barely 56 miles, almost certainly cause a serious loss of traffic to competing carriers conveying freight wholly by road. Apparently unprofitable collection and delivery services have, therefore, a considerable value in gaining or retaining traffic in the face of road competition. This fact has also been realized in other countries. In Germany, for example, the collection and delivery services were reorganized early in 1932 and the rates were substantially lowered, the railway administration undertaking to subsidize those contractors for whom the new and reduced charges were insufficient to cover their costs. Certain American railroads have even gone so far as to offer free delivery services.

Economies Made Possible

The existence of a railway-controlled cartage service enables substantial economies to be made in railway operation proper. Under British conditions, unless special instructions are given to the contrary, all higher class traffic is automatically delivered by the railway to the consignee, which practice enables freight stations to be cleared substantially in a very short time after the freight has been unloaded. The traffic can, therefore, be handled in a smaller station than would be required if the responsibility for the removal of freight rested with consignees. The fact that the cartage is virtually confined to the railways' forces also leads to an economy of space and equipment.

The foregoing statement has attempted to outline the more important advantages to a railway of an organized collection and delivery service, special stress being laid upon the particular benefits of railway-owned services. It would seem that there are certain features of British practice which could, with modifications, prove of use to the American railroads in assisting them to meet road competition.

Complete Third Year of Store-Door Service

THE Missouri-Kansas-Texas Transportation Company, subsidiary of the Missouri-Kansas-Texas, celebrated the twelfth month of the third year of its existence by handling nearly 6,000,000 lb. of outbound l.c.l. freight, the heaviest tonnage in its history. The operations of the transportation company have been successful from the beginning. The company first engaged in the transportation of l.c.l. freight on July 1, 1930, and with the close of business on June 30, 1933, rounded out what L. M. Stuart, traffic manager of the company, referred to as "three years of successful and extremely interesting operation of pick-up and delivery service, established for the purpose of supplying shippers and receivers of freight with a complete transportation service—store-door to store-door."

Storedoor Trucks at M-K-T Station, San Antonio, Tex.

The M.-K.-T. Transportation Company is a medium of transportation in its own right, contracting with truckmen for the pick-up and delivery service in terminals and with the parent railway for movement by rail from starting point to destination, of the l.c.l. freight which it handles on its own billing. The first year's operation showed a total outbound business of 39,211,113 lb. of l.c.l. freight. During the second year, 45,494,094 lb. of freight were handled, an increase of more than 6,282,981 lb. over the previous year, or 16 per cent. During the third year, just ended, the tonnage handled aggregated 54,941,231 lb., an increase over the second year of 9,447,137 lb., or 21 per cent, and an increase over the first year of 15,730,118 lb., or 40 per cent.

During the first six months of this year, the outbound business handled represented an increase of 52 per cent over the corresponding months of 1931. Every month so far this year, with the exception of January, has shown a substantial gain over the corresponding month of both 1932 and 1931, the increase for the six-month period this year over the same period of last year having been 18 per cent. May and June of this year were the heaviest tonnage months in the history of the company, with outbound billings during June, as stated before, amounting to nearly 6,000,000 lb. of l.c.l. freight. In both May and June, the gain over the corresponding month of 1932 was in excess of a million pounds.

Improved freight train services provided by the parent railway are credited by Mr. Stuart for a substantial part of the traffic gain. The inauguration of the "Katy Komet," a high-speed overnight freight train, has been especially helpful since it has enabled the transportation company to give next morning deliveries to practically all stations which it serves. Part of the credit for the success of the transportation company's operations are given by Mr. Stuart, also to the active solicitation for traffic which has been carried on not only by the traffic solicitors and freight agents, but by the drayage contractors who perform the pick-up and delivery service, and by trainmen and others having to do with the operation of the train service.

More Jobs in Private Enterprise Key to Revival

(*Continued from page 314*)

worked out what was to be the saving legislation for all time to come—the Transportation Act of 1920.

To the cornfield economist, the seat of the trouble lies in unemployment, just as lack of traffic is the major trouble with the railroads. Tinkering and experimenting to get the world back to the principles underlying the old philosophy of penury will only increase our difficulties, finally bring us all to want. But let us promote employment, increase consumption, have what we need, enjoy what we can pay for, and we shall be back on the road to peace and plenty. Government must itself lead the way to increased employment by letting up on the railroads and other regulated industries, by increasing trade and promoting the exchange of this man's services for that man's goods. Efficiency, if it is again to be our guiding star, and economy its handmaiden, ought to command that, like charity, it begin with the government. Money wrung from an impoverished citizenship only to be wasted in our capitols and city halls does not promote the best in employment or good feeling.

Efforts to ride two horses usually bring about a fall. Shall we not be obliged to adopt one philosophy or the other—either that of rigid economy or that of living up to our opportunities? And can we live half free and half slave? The same policy that is recognized as good for the country at large must be recognized as good for the public service corporations, and those directly responsible for their welfare must recognize that fact.

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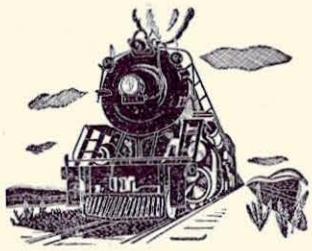

RETIRE
ROAD-CLOGGERS

The demand for speed is making all but the most modern locomotives obsolete.

You can't team up the old, slow drag, motive power with modern high speed Super-Power Locomotives.

Retire the obsolete road-cloggers in favor of new power designed for modern railroading.

LIMA LIMA LOCOMOTIVE WORKS INCORPORATED OHIO

NEWS

Motor Carrier Legislation Enacted in Massachusetts

Increased regulation for operators of common and contract motor trucks is provided

Increased regulation of highway freight carriers, including control of common and contract operators and provisions for the issuance of permits to interstate motor trucks, is embodied in legislation recently enacted in Massachusetts. The new legislation also includes a law governing the use of trailers and prescribing registration fees for such vehicles.

The regulatory law stipulates that no motor vehicle shall be operated as a common carrier until the operator has first obtained a certificate of convenience and necessity from the Department of Public Utilities; whether or not an operator is conducting a common carrier business is "a question of fact to be determined by the department." Certificates are to be issued after hearing following which the department may grant or deny the application or issue a modified certificate. In deciding upon applications the department is directed to consider "existing transportation facilities," subject, however, to the further stipulation that "No such certificate shall be denied solely on the ground that there is an existing rail service."

Common carrier rates are required to be just and reasonable and the department has authority after hearing to "allow, disallow, alter or prescribe such rates." Rebates and the granting of "unreasonable" preference or advantage are prohibited although this requirement may be modified "if in any instance the department is convinced that the absence of regulation of rates applicable to competing interstate traffic or traffic within adjacent states will operate to the detriment of the interests of motor carriers within the commonwealth or of other interests within the commonwealth."

A contract carrier is defined as an operator of motor vehicles for hire, other than a common carrier, but the definition is not intended to include persons who make an occasional trip for hire, although not regularly engaged in the transportation business. Contract carriers are required to secure a permit and must adhere to minimum rates which "in general" are not to be less than common carrier rates for similar services.

The permits which interstate carriers are required to obtain are to be issued as a matter of right "unless the department shall find that the condition of the public ways to be used is such that the operation proposed would be unsafe, or the safety of other users thereof would be endangered thereby." All operators whose vehicles make two or more trips into Massachusetts in any 30-day period are deemed regularly engaged as interstate carriers and thus required to secure these permits.

All certificates and permits expire on the January 1 following their date of issue and renewals may be refused for violations of the regulatory laws.

Hours of service provisions stipulate that except in emergencies no driver shall be on duty continuously for more than 12 hrs. and that when a continuous tour of duty of such length is completed there must be a lay-off of eight consecutive hours. Also, no driver is permitted to remain on duty for more than an aggregate of 16 hours. in any 24-hr. period.

Exempt from the law's provisions are private trucks; vehicles operated exclusively within the limits of a single municipality or within 20 mi. of the limits thereof; government vehicles and vehicles engaged exclusively in carrying U. S. mail.

The law relating to trailers reclassifies such vehicles and prescribes new registration fees on a weight basis for them as well as for trailers and all types of motor vehicles, including electric and other non-gasoline driven trucks.

Notes on the Fair

A total of 133,534, or 19,076 persons per day, or 1,590 per hour, passed through the cars being displayed by the Pullman Company at the Century of Progress Exposition, Chicago, in the seven days from August 9 to August 15. The attendance at the Pullman Company booth in another portion of the Travel and Transport building has averaged 15,000 a day.

French Railways Enter Joint Operating Agreement

The Paris-Orleans and the Midi railways of France have entered a joint agreement whereby virtually all of their operations will be pooled for a period of five years. The agreement, as outlined in a recent article in the Railway Gazette (London), stipulates that the two railroads will unify their traffic solicitation, advertising and rail-highway, rail-air and rail-water co-ordinated operations and pool certain revenues for subsequent distribution on an agreed basis. The plan will be carried out under the direction of a joint organization to be known as the Pari-Orleans-Midi and to be managed by a joint committee of the directors of the two railroads. The plan is subject to the approval of the respective stockholders and will become effective three months after such approval.

Unions Threaten to Sue Canadian Lines

Claim ante-depression wage from February 1 when voluntary cut expired

The dispute between the Canadian railways and their employees over the second 10 per cent wage cut came to a head last week with an announcement in Ottawa by Senator James Murdock, former Liberal Minister of Labor and now leading the Unions in their fight against the reduction, that the Unions were planning a fight in the courts for recovery of the wages deducted by the railways since February 1 of this year. Almost coincident with this announcement came a joint statement from the management of the Canadian Pacific and Canadian National in Montreal calling upon employees for more co-operation with the managements in getting through the present difficult situation confronting the roads. The railways' statement was signed for the Canadian Pacific by Grant Hall, vice-president, and for the Canadian National by S. J. Hungerford, acting president.

The position of the employees, according to Senator Murdock, is that when the agreement of February 4, 1932, giving effect to the first 10 per cent cut, expired, it automatically restored the agreement covering the basic wage rates.

This basic wage agreement, covering 21 different schedules, was not rendered inoperative or in any way amended by any instrument agreed on subsequent to February 1, 1933. In spite of that, the unions contend, the companies continued the 10 per cent reduction three months beyond the expiry period, and later put into effect an additional 10 per cent reduction from the basic rates.

The employees take the position that these continued cuts were made in violation of the basic wage rates agreement which, they claim, is the only instrument which now governs their wage schedules.

A provision of the February 4, 1932, agreement, Senator Murdock said, was that the disputants should get together before its expiry on January 31, 1933, and work out some plan for the future. This had not been done. Failure to achieve this had therefore, according to the senator, restored the original basic wage rates as the only agreement existing since that rate between the companies and the employees.

The statement by the railways was addressed to all men employed as locomotive enginemen, locomotive firemen, hostlers, conductors, trainmen, yardmen, dispatchers, telegraphers, assistant agents, linemen and

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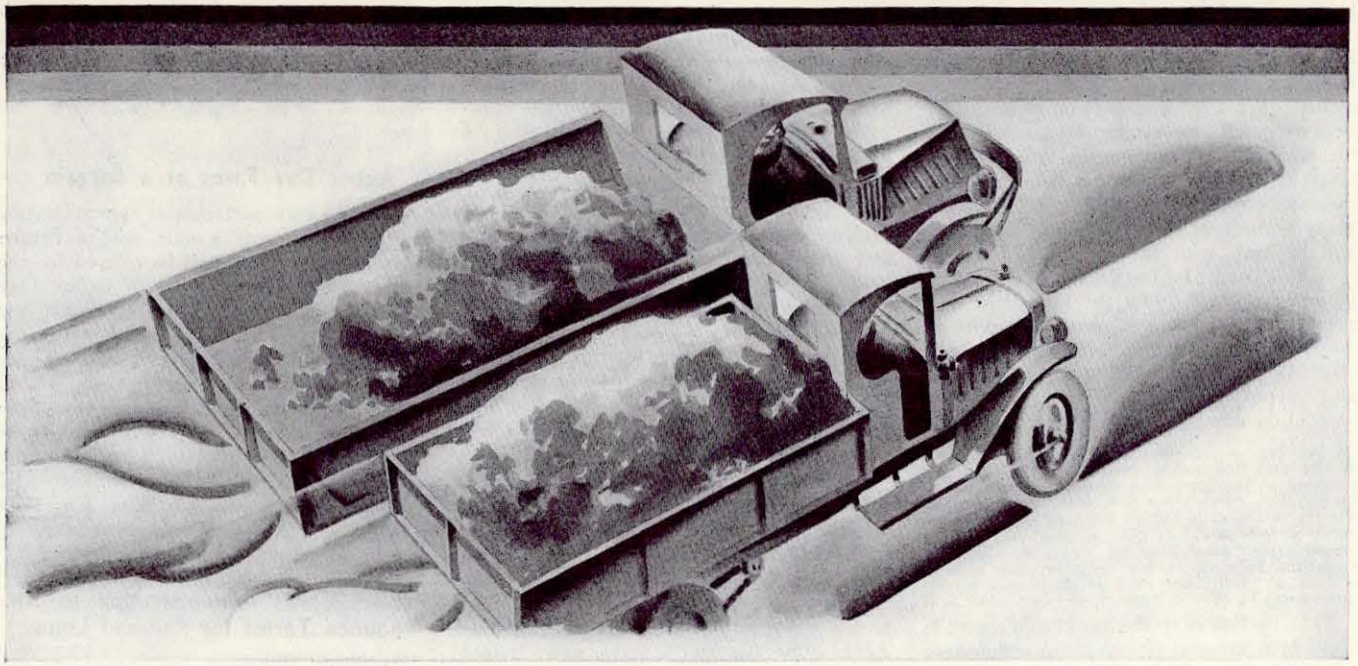
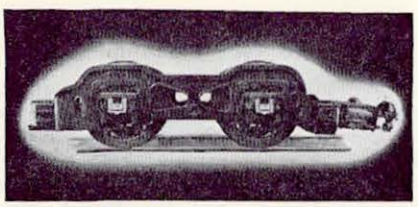


WHY BUY a 5-Ton Truck to do a 3-Ton Truck Job?

You wouldn't buy a 5-ton truck to do the work of a 3-ton truck. Yet that is just what happens when a locomotive is built today without incorporating The Booster. Unless it has The Booster, the locomotive must be built heavier and with more drivers than are needed to start the load it can haul at speed.



The Booster is concentrated power; economical power—equivalent to that of an extra pair of drivers.

It is the most economical way of obtaining tractive power. Without it, far greater weight must be built into the locomotive, to be hauled around constantly in order to supply power that is only needed in starting and at slow speeds.

Half a cent per locomotive mile covers Booster maintenance. Compare this with the cost of added power obtained by simply adding to locomotive weight.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

levermen, and it reads in part as follows:

"The existing situation in respect to the adjustment of wages calls for a statement from the railways to the employees concerned. We trust that the employees, after reviewing all the circumstances affecting the situation will accept the wage deductions in a spirit of co-operation with the managements. The employees may have every confidence that, as in the past, they will be dealt with fairly.

"The Board of Conciliation and Investigation, appointed under the Industrial Disputes Investigation Act, made its report on April 25th, 1933, dealing with the wages of engineers, firemen, conductors, trainmen and telegraphers, and its majority recommendation was as follows:

"We beg to recommend that according to the merits and substantial justice of the case the proposal of the companies should be approved, to be put into effect from first May, next, namely, the ten per cent deduction provided in the agreement of February 4th, 1932, to continue, and for wages earned after May 1st, 1933, an additional deduction be made of ten per cent, thus making a total of twenty per cent on the wages earned subsequent to May 1, 1933.

"The decline in traffic has placed the railways in a financial situation the seriousness of which it would be difficult to over-emphasize. The gross revenues of the railways have shrunk to less than fifty per cent of the 1929 level. Compared even with the extremely low figures of 1932, the gross revenues of the railways have shown serious declines in the present year, the gross receipts for the first six months of 1933 being 15.1 per cent under the corresponding period of 1932, and 52.5 per cent below the figures for the corresponding period of 1929. Net revenues have also shown severe declines.

"It is true that during recent weeks there has been some cessation in the drop in traffic compared with the very low figures of 1932. However, some of the prospects are disturbingly uncertain and the railways must deal with actualities. Under such conditions the railways cannot reasonably be expected to pay 90 per cent of the wage rates established practically at the peak of railway and general prosperity. The Canadian railways have to deal with Canadian conditions, and it is not possible for them to undertake to adjust wages of Canadian railway employees on the basis of conditions existing in the United States.

"We have to go back to 1916 to find railway operating revenues as low as they were in 1932. The Canadian cost of living index is now very greatly below that of 1929, and, indeed, is below that of 1916. On the other hand, the per hour rates of compensation of engineers, firemen, conductors, trainmen and telegraphers, even after the application of the second deduction of 10 per cent have increased on the average 68 per cent over the rates of pay in effect in 1916, so that 'real wage' rates will remain on a higher basis than they were at any date at which changes in rates of pay were previously agreed upon between 1916 and the present date. It should also be remembered that, insofar as a comparison may be made with other employees in Canada, railway employees have fared favorably.

"The railways are seeking in the wage deductions to meet existing conditions and the basic rates for calculating pay are being preserved so that consideration may be given to a lowering of the present rate of deduction as soon as conditions warrant. The managements are not without hope that the employees will recognize the facts of the situation and will accord the companies the co-operation they so gravely need."

Air-Conditioned Cars on T. & P.

Completely air-conditioned dining cars and lounge-club-observation cars are now being operated by the Texas & Pacific on its "Sunshine Special" between St. Louis, Mo., Dallas, Tex., Fort Worth and El Paso, and also between St. Louis and San Antonio, Tex. Dining cars are also air-conditioned on this road's "Texan" which operates between points in Texas and New Orleans, La., and Memphis, Tenn.

Equipment Installed

Class I railroads in the first seven months of 1933 placed in service 1,391 new freight cars, the Car Service Division of the American Railway Association announces. In the same period last year, the total was 2,251. On August 1 1,187 new freight cars were on order, compared with 1,646 on the same day last year. The railroads placed one locomotive in service in the first seven months this year compared with 34 in the same period in 1932. New locomotives on order this year totaled one compared with six on August 1, 1932.

A Correction—Wabash Front End and Grate Tests

On page 86 of the July 8 issue of the *Railway Age*, in an article entitled "Wabash Tests Effect of Front End and Grate Design," there is an illustration bearing the caption "Profile of the Huntsville Hill on the Moberly Division of the Wabash." This is incorrect; the caption should be "Performance of Engine 2818. Train 90, Kansas City, Mo., to Moberly, October 1, 1932. Adjusted Tonnage 4,180; Car Factor 5. Actual Tonnage 3,770 in 82 Cars. Time on Road 3 Hr. 57 Min.; Time in Motion 3 Hr. 15 Min."

Southern's Bargain Fares Attracted 21,000 Passengers on Week-End

More than 21,000 passengers took advantage of the one-cent-per-mile round-trip fares which were in effect on the Southern over the week-end of August 4. These reduced rates, Southern passenger traffic officials feel, produced "very gratifying revenue results." The August 4 week-end travel bargain was the fourth of a series of seven similar concessions which the Southern is making during the present year. The next, which is now being advertised, is to be offered over the week-end of September 1, including the Labor Day holiday.

Thirty-four Crossings Waiting to be Abolished

The Public Service Commission of New York State is to hold public hearings at Albany on August 30 and 31 on 18 orders which the commission has issued calling for the elimination of highway crossings, on five different railroads, which orders have not been carried out. Some of the roads have submitted plans, as required, while others have refused to comply with the commission's orders. The roads are, New York Central, 16 crossings; Long Island, 12; Boston & Albany, 1; Pennsylvania, 4; New York, Chicago, & St. Louis, 1.

Labor Day Fares at a Bargain

Railroad transportation at approximately one and two cents a mile with a return limit of two weeks will be offered by the eastern and western roads for Labor Day holidays. In the western territory the rate will be one fare plus 25 cents for the round trip in sleeping cars, and 60 per cent of the one way fare for the round trip in coaches. On the eastern lines, the round trip rate in sleeping cars will be 1-1/9 times the one way fare while the round trip rate in coaches will be 83⅓ per cent of the one way fare. In both territories, the round trip Pullman rate will be 1½ times the one way fare.

Public Works Administration to Announce Terms for Railroad Loans

President Roosevelt has issued an executive order delegating to the public works administrator, Secretary Ickes of the Interior Department, the power conferred upon him in the public works section of the national industrial recovery act to aid in the financing of railroad maintenance and equipment, when approved by the Interstate Commerce Commission. The Public Works Administration has given consideration to the terms on which such loans may be made to railroads and has announced its intention of issuing a circular describing them in the near future.

Uniform Truck Tax Planned in Canada

R. J. Manion, Minister of Railways of Canada, has announced that a Dominion-wide tariff of highway truck taxes will be drafted in Ottawa this fall at a conference of Dominion and provincial government representatives. Plans for such legislation for uniform regulation of trucks has been contemplated for some time. While the Ottawa conference will deal specifically with uniform taxes on trucks throughout all provinces, it is expected that discussion also will develop on plans for provincial public service commissions assuming jurisdiction over freight charges, similar to the jurisdiction of the Dominion board of railway commissioners over rail freight rates.

Air, Rail and Water Transport Utilized for Test Shipment

The Railway Express Agency's air-express service is now participating in a test to determine the fastest possible schedule which a shipment, moving over regularly-operated transport lines, can make between Western Canada and the British East African colony of Kenya, a distance of 10,505 mi. The test is expected to be the forerunner of a permanent route from the Canadian Pacific coast, through New York, to East and South Africa and the Near East.

The shipment involved is a memorial book entitled "British Columbia, the Making of a Province," which is being presented by Lieutenant-Governor J. Fordham

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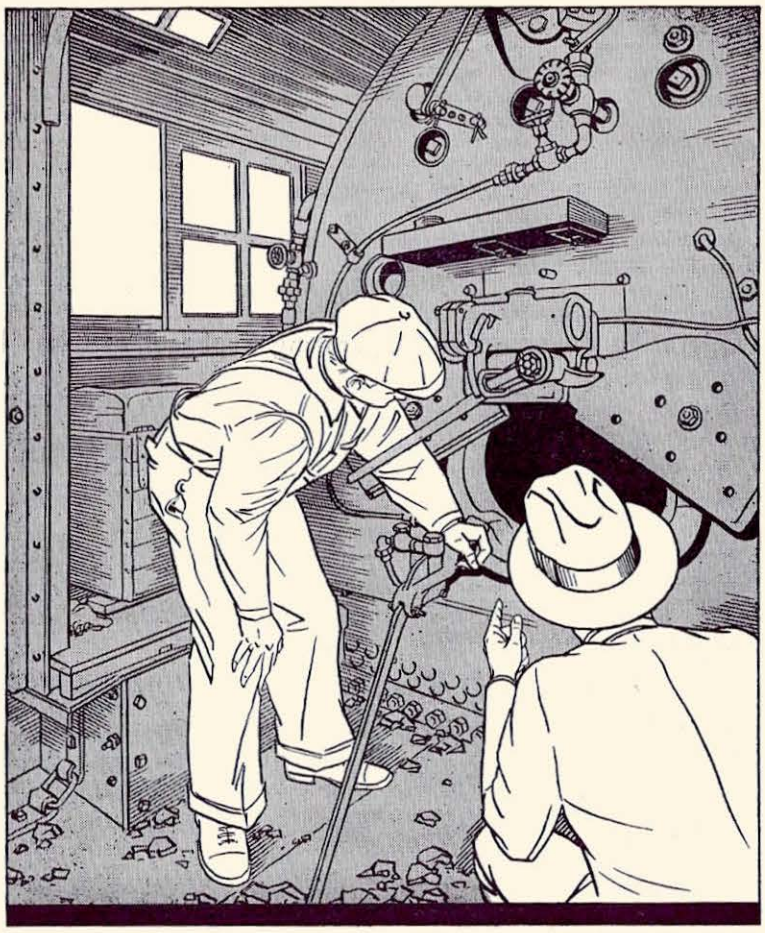
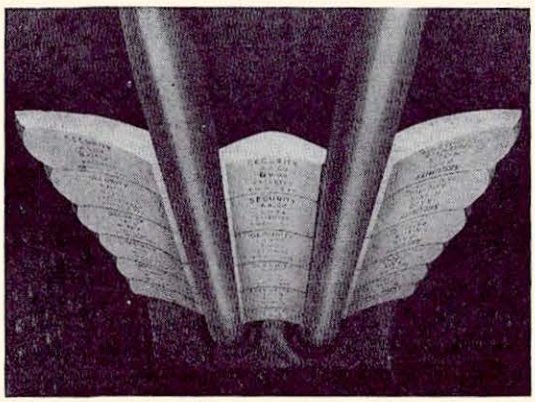


It May Look FINE When You Fire Up • • • • • BUT!

There's More To SECURITY ARCHES *Than Just Brick*

Arch Brick may look good; brick by the same maker may last well in a stationary boiler — but locomotive service introduces conditions that are new to the average fire-brick.

First is the state of motion. Sheets and Arch tubes are constantly changing position as the locomotive runs. The elements of brick strength and design to meet this condition become important.

Second is the rapid change in temperature — far more violent than in the central station.

Third is the fact that the Locomotive Arch is not just a pile of fire brick but a locomotive device which must function in harmony with other locomotive devices.

All these factors explain why the quarter century of locomotive combustion experience enables the American Arch Company to give superior Arch brick service.

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists

AMERICAN ARCH CO.
INCORPORATED

Locomotive Combustion Specialists » » »

Johnson of British Columbia to Brigadier General Sir Joseph A. Byrne, governor of Kenya. The package was scheduled to have left Victoria, B. C., on an express plane of the Railway Express Agency on August 23 and to have been carried by air to Newark, N. J., where it was scheduled to arrive at 10:20 p.m. August 24. At Newark the schedule called for a transfer of the package to a Pennsylvania train for delivery in Brooklyn, N. Y., in time for the sailing of the North German Lloyd liner "Europa" at 12:30 a.m. on August 25. As the "Europa" approaches Great Britain a ship-to-shore plane, carrying the package, will be catapulted from the ship's deck, thus putting the shipment into Southampton 24 hrs. ahead of the vessel's arrival. There, by special arrangement with British customs officials and the Southern Railway, the 75 mi. to Croydon, London, will be covered by fast express train. On August 30 the package will leave, via Imperial Airways express plane for Paris, France, where, a few hours later, it will be put abroad the Simplon Express of the Paris, Lyons & Mediterranean for Brindisi, Italy, where it will arrive via the Italian State Railways September 1. An Imperial Airways seaplane will next take the shipment across the Mediterranean where it will be transferred to another Imperial plane for movement over a route via Cairo, Egypt, to Nairobi, Kenya. It is expected to reach this latter point—its final destination—on September 5.

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States *

Compiled From 150 Monthly Reports of Revenues and Expenses Representing 151 Class I Steam Railways

FOR THE MONTH OF JUNE, 1933 AND 1932

Item	United States		Eastern District		Southern District		Western District	
	1933	1932	1933	1932	1933	1932	1933	1932
Average number of miles operated	240,969.85	241,846.86	59,503.61	59,723.77	45,784.78	46,179.88	135,681.46	135,943.21
Revenues:								
Freight	$223,236,390	$185,858,907	$94,480,384	$79,236,997	$44,173,186	$34,409,737	$84,582,820	$72,212,173
Passenger	30,981,253	32,633,466	17,491,152	18,992,480	3,039,748	3,394,430	10,450,353	10,246,556
Mail	7,540,773	7,906,254	2,976,615	3,147,016	1,275,833	1,309,366	3,288,325	3,449,872
Express	4,901,651	4,876,300	2,133,229	2,370,184	831,865	599,066	1,936,557	1,907,050
All other transportation	6,451,070	6,552,172	3,548,530	3,823,588	573,753	450,063	2,328,787	2,278,521
Incidental	4,696,550	5,179,719	2,590,470	3,050,420	654,092	633,500	1,451,988	1,495,799
Joint facility—Cr.	698,578	777,021	210,238	243,362	175,169	178,705	313,171	354,954
Joint facility—Dr.	195,182	238,587	49,615	63,934	19,740	17,545	125,827	157,108
Railway operating revenues	278,311,083	243,545,252	123,381,003	110,800,113	50,703,906	40,957,322	104,226,174	91,787,817
Expenses:								
Maintenance of way and structures	28,804,827	32,712,584	11,256,869	12,038,662	5,519,916	6,027,521	12,028,042	14,646,401
Maintenance of equipment	48,133,880	49,727,745	21,167,478	22,233,457	9,311,208	9,136,550	17,655,194	18,357,738
Traffic	7,285,736	8,427,251	2,648,956	3,253,368	1,405,686	1,592,278	3,231,094	3,581,605
Transportation	87,632,083	91,431,759	40,318,909	42,756,384	14,843,515	14,673,793	32,469,659	34,001,582
Miscellaneous operations	1,888,190	2,281,719	933,241	1,132,142	196,702	237,308	758,247	912,269
General	11,838,332	13,181,010	5,075,607	5,706,820	2,095,399	2,269,222	4,667,326	5,204,968
Transportation for investment—Cr.	258,478	466,302	32,671	170,986	18,712	37,558	207,095	257,758
Railway operating expenses	185,324,570	197,295,766	81,368,389	86,949,847	33,353,714	33,899,114	70,602,467	76,446,805
Net revenue from railway operations	92,986,513	46,249,486	42,012,614	23,850,266	17,350,192	7,058,208	33,623,707	15,341,012
Railway tax accruals	23,088,683	23,916,120	9,571,675	9,933,579	4,092,220	4,397,662	9,424,788	9,584,879
Uncollectible railway revenues	77,116	70,280	29,429	29,240	12,007	11,444	35,680	29,596
Railway operating income	69,820,714	22,263,086	32,411,510	13,887,447	13,245,965	2,649,102	24,163,239	5,726,537
Equipment rents—Dr. balance	7,235,246	7,141,218	3,614,801	3,429,830	483,480	451,556	3,136,965	3,259,832
Joint facility rent—Dr. balance	3,102,283	2,822,202	1,739,030	1,534,624	192,271	343,527	1,170,982	944,051
Net railway operating income	59,483,185	12,299,666	27,057,679	8,922,993	12,570,214	1,854,019	19,855,292	1,522,654
Ratio of expenses to revenues (per cent)	66.59	81.01	65.95	78.47	65.78	82.77	67.74	83.29

FOR SIX MONTHS ENDED WITH JUNE, 1933 AND 1932

Average number of miles operated	241,195.01	241,729.39	59,544.57	59,722.18	45,854.99	46,190.27	135,795.45	135,816.94
Revenues:								
Freight	$1,134,703,459	$1,226,526,192	$484,257,000	$540,326,005	$238,788,326	$237,992,507	$411,658,133	$448,207,680
Passenger	150,002,620	201,274,622	89,717,696	119,067,584	18,549,100	24,333,391	41,735,824	57,873,647
Mail	45,178,291	48,933,824	17,749,810	19,298,970	7,773,572	8,341,314	19,654,909	21,293,540
Express	22,801,772	29,684,521	9,489,374	13,183,192	5,038,776	5,594,390	8,273,622	10,906,939
All other transportation	34,341,460	40,750,895	19,386,913	23,509,283	3,078,880	3,384,428	11,875,667	13,857,184
Incidental	25,378,957	32,964,869	14,520,719	19,400,251	3,808,963	4,426,330	7,049,275	9,138,288
Joint facility—Cr.	3,917,997	4,672,130	1,275,634	1,578,642	862,446	857,606	1,779,917	2,235,882
Joint facility—Dr.	1,101,595	1,436,316	309,660	416,397	106,290	111,367	685,645	908,552
Railway operating revenues	1,415,222,961	1,583,370,737	636,087,486	735,947,530	277,793,773	284,818,599	501,341,702	562,604,608
Expenses:								
Maintenance of way and structures	147,499,392	188,510,487	57,620,429	77,291,407	30,634,215	37,599,902	59,244,748	73,619,178
Maintenance of equipment	278,762,548	325,919,145	122,810,808	148,900,692	53,297,219	59,542,325	102,654,521	117,476,128
Traffic	42,672,896	51,176,819	15,728,318	19,787,292	8,258,506	9,499,694	18,686,072	21,889,833
Transportation	518,656,875	606,737,122	239,798,582	286,622,021	88,580,625	99,462,146	190,277,668	220,652,955
Miscellaneous operations	10,893,987	14,955,067	5,496,260	7,526,836	1,337,773	1,828,774	4,059,954	5,599,457
General	71,881,995	81,735,282	30,883,940	35,778,649	12,229,643	14,082,701	28,768,412	31,873,932
Transportation for investment—Cr.	1,427,089	2,149,274	568,234	742,224	165,295	146,871	693,560	1,260,179
Railway operating expenses	1,068,940,604	1,266,884,648	471,770,103	575,164,673	194,172,686	221,868,671	402,997,815	469,851,304
Net revenue from railway operations	346,282,357	316,486,089	164,317,383	160,782,857	83,621,087	62,949,928	98,343,887	92,753,304
Railway tax accruals	133,629,359	146,136,550	55,135,588	59,365,981	25,587,923	27,844,187	52,905,848	58,926,382
Uncollectible railway revenues	484,280	471,538	197,690	175,736	61,960	67,123	224,630	228,679
Railway operating income	212,168,718	169,878,001	108,984,105	101,241,140	57,971,204	35,038,618	45,213,409	33,598,243
Equipment rents—Dr. balance	41,538,547	43,006,463	20,467,118	21,443,494	3,775,503	3,148,469	17,295,926	18,414,500
Joint facility rent—Dr. balance	17,726,957	17,258,700	9,497,770	9,215,877	1,884,788	1,760,354	6,344,399	6,282,469
Net railway operating income	152,903,214	109,612,838	79,019,217	70,581,769	52,310,913	30,129,795	21,573,084	8,901,274
Ratio of expenses to revenues (per cent)	75.53	80.01	74.17	78.15	69.90	77.90	80.38	83.51

* Excludes switching and terminal companies. Statements prior to January, 1933, included switching and terminal companies.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

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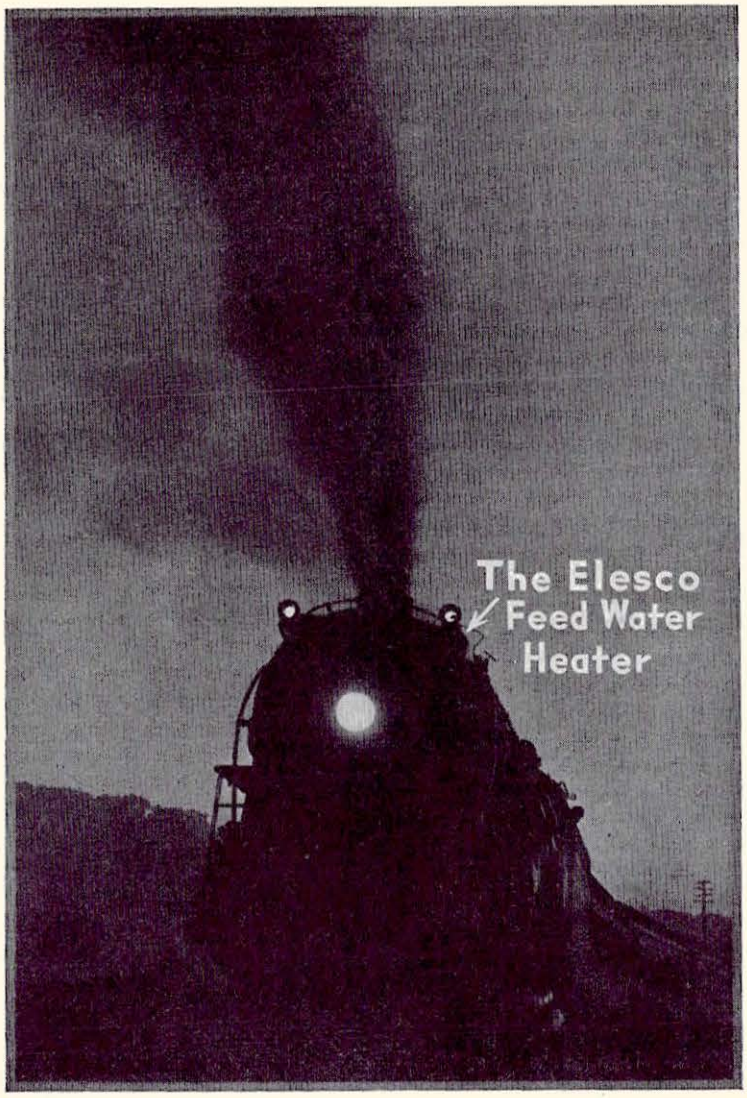

It is good business

to reclaim heat from 15 per cent of the *waste* exhaust steam from your locomotives, as is done through Elesco feed water heaters. This reclaimed heat replaces the same amount of heat otherwise generated by fuel in the firebox — which means a saving of 15 per cent in your fuel bill.

On many railroads Elesco feed water heaters are now making this saving day in and day out. In fact, almost 4000 locomotives are so equipped for more economical performance.

It is good business to apply Elesco feed water heaters — the process is simple, the principle is sound and the equipment incorporates the practicability, simplicity and ruggedness of design so necessary for reliability and high efficiency. Write for details.

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Air-Conditioned Cars Between New York and Philadelphia

The Pennsylvania has completed its program of air-conditioning for all coaches, dining and parlor cars on its New York-Philadelphia trains, and 250 air-conditioned cars are now in service between these cities. The New York-Philadelphia trains leave each city on the even hour; and the New York-Washington trains, which already were thus equipped and which stop at North Philadelphia and at the new station at Thirtieth street, Philadelphia, leave New York on the half-hour, so that passengers may enjoy this improved service practically every half-hour throughout the business day. Counting both northbound and southbound, there are 55 air-conditioned trains each day between New York and Philadelphia.

Look Both Ways and Live

The headline "Look Both Ways and Live" gives the gist of circular No. S-371 which has been issued by the Safety Section, A.R.A., for the guidance of safety committees for the month of September. The circular points out that more employees are killed when struck by locomotives or cars than from any other single cause, and summarizes its admonitions under three points: (1) Don't step on any track unless absolutely necessary; (2) Don't step on any track until you have looked both ways. . . . (3) If there are multiple tracks be *doubly sure*. The salient feature of the pamphlet is a full-page picture of a trackman who came out of his tool house and ran against a moving locomotive, with fatal result.

M-K-T Establishes Flat Rate for L. C. L. Shipments as Experiment

The Missouri-Kansas-Texas, on August 5, established a flat rate with free pick-up at origin and delivery at destination, on less-than-carload merchandise shipments throughout southeast Kansas and southwest Missouri. A schedule of rates on l. c. l. freight of all kinds, with the exception of a few commodities not susceptible of handling at these rates, has been published in a supplement to Tariff 6920-A.

These rates have been adopted as an experiment and were decided upon because of the volume of potential tonnage from Kansas City and the fact that a large amount of freight is carried by trucks from that point. The truck rates are less than rail rates, and the trucks take all business at a flat rate irrespective of classification. In preparing the new railroad tariff, the key adjustment was to Joplin, Mo., to which point a 35-cent rate was established, and the rates to other points were based upon this figure.

Sub-committees Appointed by Eastern Co-ordinating Group

The Eastern Regional Co-ordinating Committee met in New York on August 23 and appointed three sub-committees to assume the duties of the General Committee for eastern territory, the functions of which Co-ordinator Eastman asked the Co-ordinating Committee to assume.

The sub-committees will deal respectively with accounting, traffic and operating matters. Their membership is as follows:

Accounting: W. C. Wishart (vice-president, N. Y. C.); F. J. Fell (vice-president, P. R. R.); J. J. Elkin (comptroller, B. & O.), and H. S. Palmer (vice-president, N. Y. N. H. & H.).

Traffic: F. J. Wall (vice-president, N. Y. N. H. & H.); Golder Shumate (vice-president, B. & O.); F. M. Whitaker (vice-president, C. & O.); C. J. Brister (vice-president, N. Y. C.), and J. L. Eysmans (vice-president, P. R. R.).

Operating: M. C. Clement (vice-president, P. R. R.); H. L. Ingersoll (assistant to president, N. Y. C.); C. W. Galloway (vice-president, B. & O.) and R. E. Woodruff (vice-president, Erie).

Freight Traffic in June

The volume of freight traffic moved by the Class I railroads in June, measured in net ton-miles, showed an increase of 27 per cent above the same month in 1932, according to reports compiled by the Bureau of Railway Economics. The total was 23,712,435,000 net ton-miles, compared with 18,673,341,000 in June, 1932, but compared with the same month in 1931, the total was less by 16.1 per cent. In the Eastern district, there was an increase of 29.5 per cent compared with the same month of 1932, while the Southern district reported an increase of 27.2 per cent and the Western district 23.4 per cent.

The total for the first six months of 1933 was 123,735,325,000 net ton-miles, a reduction of 3.3 per cent under the corresponding period in 1932, and a reduction of 29 per cent under the corresponding period in 1931. The Eastern district for the six months reported a reduction of 3.6 per cent compared with the same period in 1932, the Southern a reduction of one-tenth of one per cent, and the Western a reduction of four per cent.

Codes Approved For Iron and Steel, Oil, and Lumber

Codes of fair competition under the national industrial recovery act to govern the iron and steel, lumber, and oil industries, which are expected to increase the prices paid by railroads for their consumption of the products of these industries, were approved by President Roosevelt on August 19 after having been revised to accord with the views of the National Recovery Administration from the form in which they were originally submitted by the industries. The iron and steel code, which is to continue in effect for an experimental period of 90 days, provides for a maximum average employment of 40 hours a week for a six-months period, with a maximum of 48 hours and 6 days in any one week. On and after November 1, as soon as the members of the code shall be operating at 60 per cent of capacity, they are to adjust operations so that, except as to executives and employees in supervisory and technical capacities and their staffs and emergency work, they will establish the eight-hour day for all employees. The administration of the code is to be under the direction of the board of directors of the American Iron & Steel Institute whose meetings may be attended by three representatives of the administration. Each member of the code is to file

Railways Cannot Pay Taxes Unless They Have Traffic

During the nine months ending August 1, the nation's railroads have abandoned 1,800 miles of track. The causes for this abandonment, in most cases, have been due to the development of hard-surfaced highways, the rapid growth of the business of common carriers operating on the highways, and the lack of public support of the railroads. This condition presents a serious problem for the American people.

The Norfolk & Western Railway recently was granted conditional authority by the Interstate Commerce Commission to abandon 54 miles of a branch line between Wayne and Lenore in Wayne and Mingo Counties, W. Va. The operation of the line is not justified by the traffic now available or in prospect, and because its operation has resulted in steadily increasing deficits.

Political units and individuals protesting the abandonment of the line, set forth in their intervening petition that highway bonds have been issued by Wayne and Mingo Counties, and that the loss of N. & W. taxes resulting from the abandonment will seriously impair the ability of the various political units involved to pay the interest and principal on the bonds. Should a railroad continue to operate a line at a constantly increasing deficit for the sole purpose of paying off bonds issued for the purpose of building highways upon which the railway's competitors operate?

The Norfolk & Western Railway has grown up with the territory it serves. It maintains a department of industrial and agricultural experts whose entire activities are devoted to the development of its territory. The Norfolk & Western, or any other railroad for that matter, has not and will not abandon any portion of its line in any territory where that operation is justified and where there is sound prospect of future development in the territory.

The results of the abandonment of railway lines are far reaching. It means unemployment. It means a reduction in taxes of national, state, county, local and school government. It means a decrease in the purchases of railway materials and supplies.

These things vitally affect the economic and social welfare of the people. When distributing its traffic and shaping its policy toward transportation matters, the public should give serious consideration to these facts.

From a Statement Issued by the N. & W.

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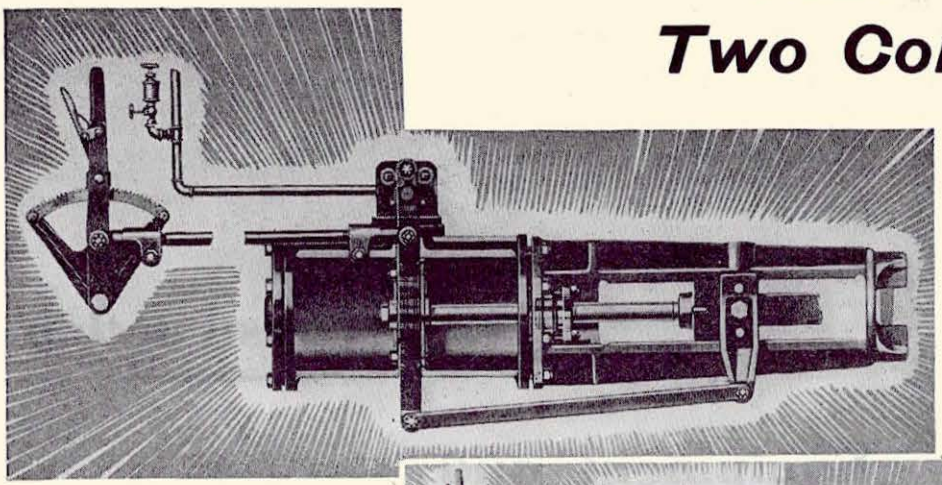
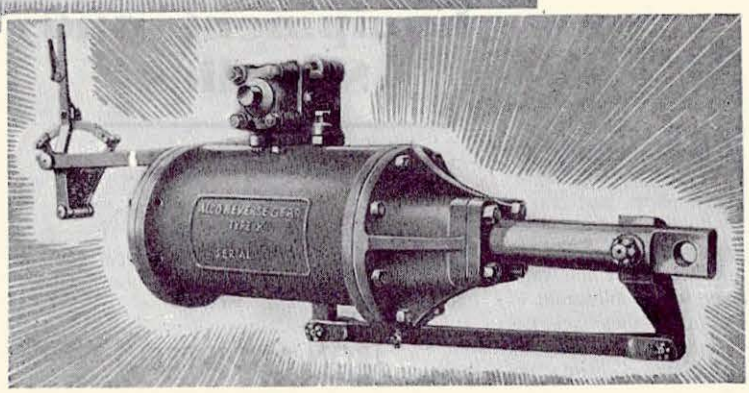
Alco REVERSE GEARS...

Your Choice of Two Constructions



Type "G" Gear with crosshead and guides.



Type "K" Gear with trunk-piston rod.

SIMPLE
ACCURATE
EASILY MAINTAINED
REASONABLY PRICED

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with the secretary of the Institute within ten days a list showing the base prices for all its products and from time to time thereafter maintain on file such a list, agreeing not to make changes except on ten days' notice. Lists of prices filed with the secretary shall be open to inspection at all reasonable times by any one. All base prices for standard Tee rails of more than 60 pounds per yard and all base prices for angle bars and rail joints are to be f.o.b. mill of the producer, or, in the case of rails, angle bars and rail joints carried by water from any Atlantic coast or Gulf port to any Gulf or Pacific coast port, c.i.f. the port of destination.

Cotton Belt Vehicle Container Rates Approved With Some Changes

After nearly a year of investigation the Interstate Commerce Commission on August 18 made public a report by Division 2 approving with some changes the ferry-truck rates proposed by the St. Louis Southwestern to become effective on September 1, 1932, for an experimental period which would have expired September 1 this year, covering the movement of motor truck, trailers, semi-trailers, truck or trailer bodies, or similar containers, between St. Louis and certain points in Arkansas, and also in Shreveport, La. The schedules which had been suspended on protests by truckers and by certain southwestern railroads were ordered canceled but without prejudice to the filing of new ones applying between St. Louis and Blytheville, Jonesboro, Little Rock, North Little Rock and Pine Bluff, Ark., but not Shreveport, in accordance with the views expressed in the report.

The commissioners found no reason for applying the rates as far as Shreveport and held that the company had failed to show that the rates would be compensatory where only one vehicle would be loaded on a car; but held that the rates would be compensatory for a minimum of two vehicles per car, that they are not lower than are reasonably necessary to meet motor-truck competition, and that they would not disrupt existing relations between the rates from St. Louis and those from Memphis. Objection was also made to the application of the rates to "other similar containers," as being too ambiguous.

Hearings to Be Held on Bus Code

Public hearings on a code of fair competition for the motor bus industry have been scheduled by the National Recovery Administrator, Hugh S. Johnson, to begin Wednesday, August 30, at Washington. Deputy Administrator Malcolm Muir will conduct the hearings. Proponents of the code, the National Association of Motor Bus Operators, claim to represent 75 percent of the industry through companies giving employment to approximately 71,000 persons engaged in inter-city bus transportation.

The code, as submitted, proposes a minimum weekly wage "at a rate of not less than $15" for any employee except porters, cleaners, apprentice mechanics, apprentice drivers and casual or part-time workers. It specifies a maximum work week of 40 hours, averaged for the year, in the case of clerical employees exclusive of transportation service men; with these latter, and maintenance employees, to work a yearly average of not more than 48 hours per week.

After defining the term "passenger motor carrier" to mean "any person, firm, or corporation transporting or offering or proposing to transport by motor vehicle for compensation persons and/or persons and package express, excess baggage, newspapers and United States mail over the public highways of the United States in interstate or foreign commerce," the code asks that the President license all existing passenger motor carriers and that thereafter "no new licenses shall be issued or extension of licenses granted except upon a sufficient showing of public convenience and necessity as may be required."

Both the American Highway Freight Association and the newly organized Federated Truck Associations held meetings in Washington this week for the purpose of perfecting their organizations and considering various changes in their proposed codes. The American Highway Freight Association was expected to reach a decision as to whether private and industrial operators of trucks desire to participate in the membership and in the code with the operators of for-hire trucks.

Equipment and Supplies

FREIGHT CARS

Godfrey L. Cabot, Inc., Boston, Mass., has ordered from the American Car & Foundry Company five 40-ton steel bulk commodity cars for handling carbon black.

IRON AND STEEL

The Southern Pacific has ordered 170 tons of structural steel for a viaduct at Naples, Cal., from the Virginia Bridge & Iron Company.

Pennsylvania.—The Arundel Corporation, Baltimore, Md., has awarded to the Concrete Steel Company a contract for 850 tons of reinforcing steel for use in the construction on this road's new Union tunnel in Baltimore.

SIGNALING

Automatic Interlocking at Erwins, N. Y.

The New York state Public Service Commission has approved plans for the construction of automatic interlocking at Erwins, N. Y., the crossing of the Delaware, Lackawanna & Western and the Erie, the arrangement being introduced to supersede the mechanical interlocking now maintained at that point. This interlocking is 33 years old. The order of the commission stipulates that the speed limit on the Lackawanna shall be 40 miles an hour and that on the Erie 35 miles an hour.

MISCELLANEOUS

The St. Louis-San Francisco is reemploying 150 men in its maintenance of way and maintenance of equipment departments at various points along its line.

The Electric Storage Battery Company, Philadelphia, Pa., will furnish six battery equipments for use on the oil-electric locomotives recently bought by the Delaware, Lackawanna & Western from the American Locomotive Company.

The Reading Company on August 15 abolished the plan whereby its office employees have been required to take certain days off each month. Early in the year office employees were required to take off four days a month, on July 15 the number was reduced to three days a month and on August 1, to two days a month, and since August 15 the full time schedule has been in effect.

Construction

Elgin, Joliet & Eastern.—A contract has been awarded to the American Bridge Company, Pittsburgh, Pa., for furnishing and erecting the superstructure of a double-track bridge that this company is constructing across the Des Plaines river at Joliet, Ill. The contract for the construction of the substructure of this bridge was held by the Powers-Thompson Company, Joliet.

Fairport, Painesville & Eastern.—The Interstate Commerce Commission has denied the application of this company for authority to extend its line from its present terminus in the Harpersfield, Ohio, shale beds to a connection with the Pennsylvania at Austinburg, 7.6 miles.

Louisville & Nashville.—The C. G. Kershaw Company, Birmingham, Ala., has been awarded a contract for the construction of new abutments and the installation of a three-track through-girder bridge at the crossing of this company's tracks over Eighth avenue, Nashville, Tenn. This project is being undertaken in connection with a plan of the city for widening Eighth avenue, which work has been completed except for that part of the street in the vicinity of the railroad's bridge. The estimated cost of the work involved in the contract awarded to the Kershaw Company is about $24,000. The superstructure of the bridge will be fabricated by the Virginia Bridge & Iron Company, Roanoke, Va.

St. Louis-San Francisco—A contract has been awarded to the J. W. McMurry Contracting Company, Kansas City, Mo., for the construction of a new pier at this company's bridge across the Meramec river at Pacific, Mo. The Frisco has also awarded a contract to the Hedges-Weeks Construction Company, Springfield, Mo., for underpinning a pier in its bridge across the South Canadian river at Francis, Okla.

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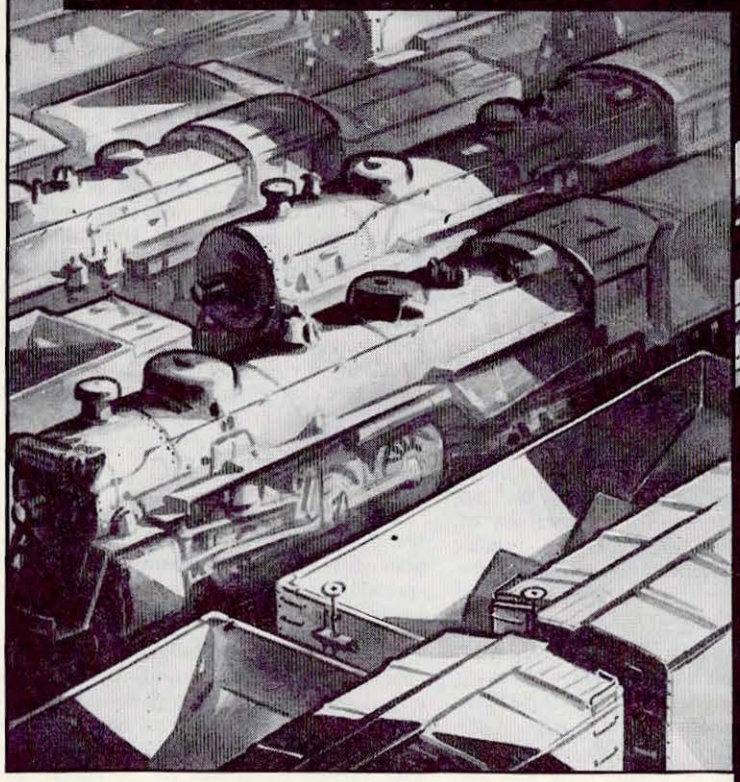
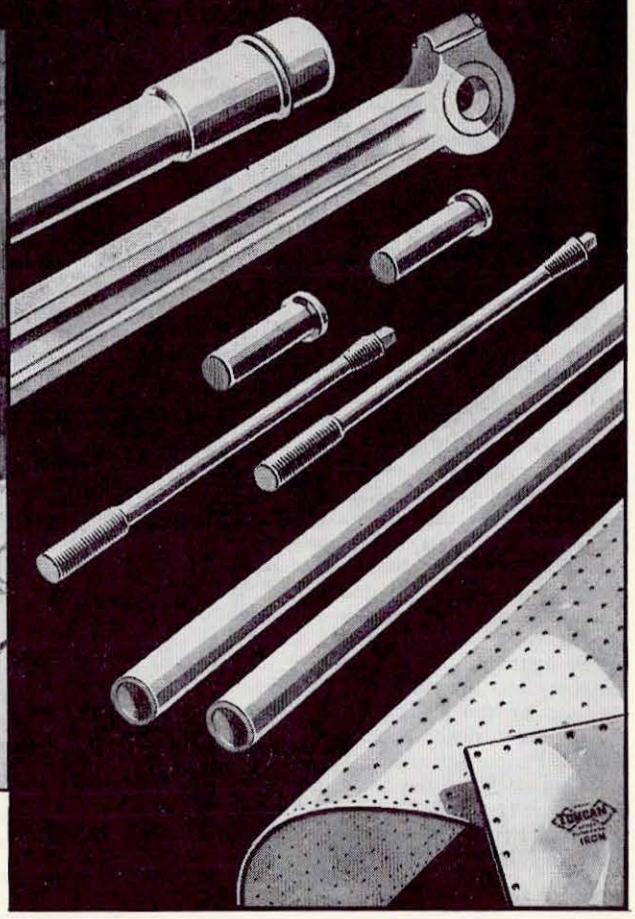
GREATER PERMANENCY *for* EQUIPMENT REPAIRS





A great flood of repair work has been dammed up that will soon be released. » » » Give thought now to the materials to be used. Be sure that they will have the longer life that metallurgy has given modern alloy irons and steels. » » » For case-hardened parts, Republic metallurgists have perfected Agathon Nickel Iron which provides a tougher core which, in turn, means fewer breakages. » » » When axles, rods and pins encounter higher stresses, there are Agathon Alloy Steels of greater strength and fatigue resistance to meet the new demands. » » » Alloy staybolts of both steel and iron are furnished by Republic to supply the increased fatigue resistance and greater uniformity of composition that reduce staybolt breakage. » » » Toncan Iron has an increased corrosion resistance that makes it preferred for boiler tubes, firebox sheets, car plates, and everywhere that corrosion is troublesome. » » » Use these better materials to control the rising tide of equipment maintenance.

Toncan Iron Boiler Tubes, Pipe, Plates, Culverts, Rivets, Staybolts, Tender Plates and Firebox Sheets • Sheets and Strip for special railroad purposes • Agathon Alloy Steels for Locomotive Parts • Agathon Engine Bolt Steel • Agathon Iron for pins and bushings • Agathon Staybolt Iron • Climax Steel Staybolts • Upson Bolts and Nuts • Track Material, Maney Guard Rail Assemblies • Enduro Stainless Steel for dining car equipment, for refrigeration cars and for firebox sheets • Agathon Nickel Forging Steel.

The Birdsboro Steel Foundry & Machine Company of Birdsboro, Pa. has manufactured and is prepared to supply under license, Toncan Copper Molybdenum Iron castings for locomotives.

CENTRAL ALLOY DIVISION, MASSILLON, OHIO

AGATHON STEELS

REPUBLIC STEEL
CORPORATION
GENERAL OFFICES YOUNGSTOWN, OHIO

TONCAN COPPER MOLYBDENUM IRON

Financial

ARIZONA SOUTHERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line from Silverbell, Ariz., to Red Rock, 21 miles.

CHICAGO, ROCK ISLAND & PACIFIC.—*Merger of Subsidiaries Conditionally Approved.*—Division 4 of the Interstate Commerce Commission has issued a report finding the merger of the Chicago, Rock Island & Pacific and eleven subsidiary companies, of which nine are non-operating, to be in the public interest but has deferred the issuance of an order approving the plan pending the acceptance of conditions that the Rock Island agree to abide by such findings as the commission may hereafter make with respect to the acquisition of the Wichita Northwestern at its commercial value and as to the proper determination of the consideration in each case and the proper method of accounting therefor. The Rock Island proposed merely to take over directly, the financial obligations of its subsidiary companies for which it is now responsible through its guaranties or proprietary interests and counsel for the company had stated that it stood ready to accept the commission's decision as to the accounting, which is under investigation by the Bureau of Accounts.

The aggregate mileage of the lines of the companies affected is about 9,358, now operated by the Chicago, Rock Island & Pacific, the Chicago, Rock Island & Gulf, and the Peoria Terminal. The non-operating companies are the St. Paul & Kansas City Short Line, the Choctaw, Oklahoma & Gulf, the Rock Island, Arkansas & Louisiana, the Morris Terminal, the Peoria, Hanna City & Western, the Rock Island & Dardanelle, the Rock Island, Stuttgart & Southern, the Rock Island Memphis Terminal, and the Rock Island Omaha Terminal.

Because the recent emergency railroad act omitted the requirement as to the relation between the value and the capital obligations of the proposed consolidated corporation, it was not necessary for the commission to make findings as to that point, although it had brought up to date the tentative valuation for that purpose.

President James E. Gorman at the hearing had testified that the primary and basic purpose of the application was the unification of all the properties of the system under single ownership of the Rock Island, so as to give that company the power to secure its bonds by direct lien upon all the properties and that the company had been advised by bankers and other financial authorities that the proposed unification would greatly improve the company's credit. The company has opposed the proposal for including the Wichita Northwestern, which owns about 100 miles of line in west-central Kansas, on the ground that it was premature in a proceeding involving only an intra-system merger.

Commissioner Mahaffie dissented in part, objecting to the condition as to the Wichita Northwestern as complicating a situation already sufficiently complex, and Commissioner Tate concurred in his expression.

KANSAS CITY, EXCELSIOR SPRINGS & NORTHERN.—*Abandonment.*—The Interstate Commerce Commission has authorized the abandonment as to interstate commerce of this line, which is operated by the Wabash, extending from Excelsior Springs Junction, Mo., to Excelsior Springs, 8.7 miles.

MINNESOTA, DAKOTA & WESTERN.—*Abandonment of Operation.*—The Interstate Commerce Commission has authorized this company to abandon operation in interstate commerce over a line of railroad owned by the International Lumber Company from Bear River Junction, Minn., to Towle, 1.8 miles and over the line of the Big Fork & International Falls from Bear River Junction to Littlefield, 0.8 miles.

OREGON ELECTRIC.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a branch line extending from Gray, Ore., westerly to the end of the line at East Corvalis, 5.2 miles.

PENNSYLVANIA.—*Acquisition.*—This company and the Grand Trunk Western have filed with the Interstate Commerce Commission an amended application for authority to acquire control by purchase of stock and by lease of the Grand Trunk-Pennsylvania Transportation Company, the former application having been dismissed for jurisdictional reasons.

PERE MARQUETTE.—*Loan Application Withdrawn.*—This company has withdrawn its recent application for a loan of $2,000,000 from the Reconstruction Finance Corporation, to pay taxes in Michigan, because its revenues have been improving and the taxing authorities have not insisted upon payment of penalties.

WESTERN PACIFIC.—*R. F. C. Loan Denied.*—Commissioner B. H. Meyer of the Interstate Commerce Commission has advised T. M. Schumacher, chairman of the executive committee, that Division 4 of the commission has been unable to find that the loan of $1,000,000 from the Reconstruction Finance Corporation applied for to pay semi-annual interest due September 1 would be adequately secured and that it must withhold its approval.

Dividends Declared

Boston & Albany.—$2.00, quarterly, payable September 30 to holders of record August 31.

Chestnut Hill.—75c, quuarterly, payable September 5 to holders of record August 19.

Average Prices of Stocks and of Bonds

	Aug. 22	Last week	Last year
Average price of 20 representative railway stocks..	48.11	45.84	29.93
Average price of 20 representative railway bonds..	73.39	74.25	71.27

Valuation Reports

The Interstate Commerce Commission has issued final valuation reports finding the final value for rate-making purposes of the property owned and used for common-carrier purposes as of the respective valuation dates as follows:

Los Angeles Junction..	$82,000 (owned) 2,315,000 (used)	1927
Fore River.....	225,000	1927
Detroit, Cairo & Sandusky	750,000	1928
Arcadia & Betsey River	235,000	1927
Mississippi Export.....	585,000	1928

Railway Officers

OPERATING

O. J. DeLamotte, traffic manager of the Mississippi Export Railroad Company, has been elected general manager, with headquarters at Moss Point, Miss., to succeed **C. C. MacLeod,** deceased.

J. M. Munnings, general yardmaster of the Grand Trunk Western, with headquarters at Pontiac, Mich., has been appointed trainmaster at Durand, Mich., succeeding **E. O. Dunn,** who has been appointed chief dispatcher at Durand.

J. S. Miller, trainmaster and roadmaster on the Chicago, Burlington & Quincy, with headquarters at Greybull, Wyo., has been promoted to assistant superintendent of the McCook division, with headquarters at Denver, Colo., to succeed **H. C. Murphy,** who has been promoted.

TRAFFIC

Louis L. Flora, depot passenger agent for the Wabash at Chicago, has been appointed to the newly-created position of special passenger representative at St. Louis, Mo.

Edward D. Campbell, who has been appointed traffic manager of the Bessemer & Lake Erie, with headquarters at Pittsburgh, Pa., as noted in the *Railway Age* of August 12, has been in railroad service with various companies for 36 years. He was born on November 11, 1878, at Glenshaw, Pa., and entered railroad service in 1897 with the Pittsburgh & Western (now part of the Baltimore & Ohio), later going with the B. & O. In 1903 Mr. Campbell left the latter company to become connected with the Pittsburgh & Lake Erie and, after serving this road in various capacities for five years, he went with the Bessemer & Lake Erie, being appointed assistant general freight agent in 1922. In 1928 he was further advanced to general freight agent which position he held until his recent promotion to traffic manager.

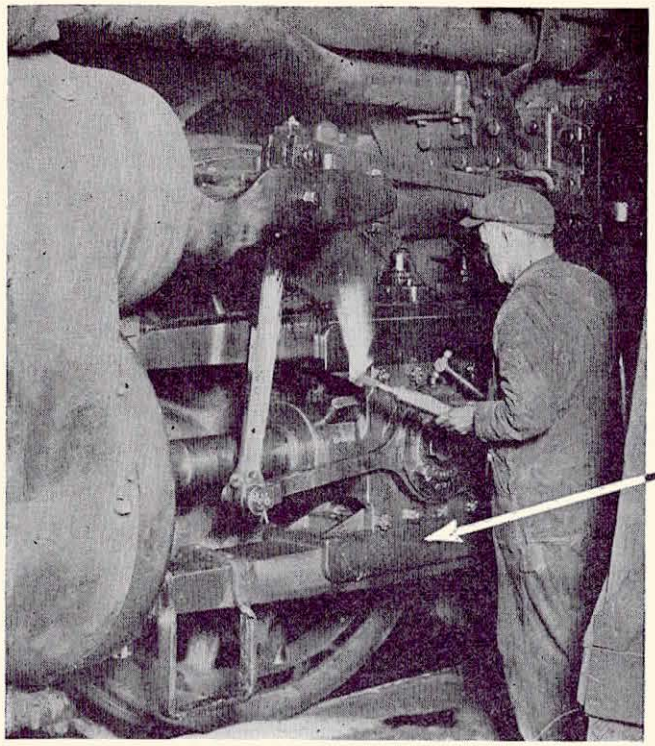
PURCHASES AND STORES

O. A. Donagan has been appointed general storekeeper of the Main Central and the Portland Terminal Company, with headquarters at Boston, Mass. **J. E. Mills** has been appointed storekeeper of the Portland Terminal at Rigby, Me., and **H. P. Richardson** has been appointed storekeeper at Waterville, Me. The two latter officers will be responsible for ordering, receiving, custody and disbursing of maintenance of equipment materials.

OBITUARY

John P. Cummins, assistant general freight and passenger agent on the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Ore., was killed on August 18 when he fell from the eighth floor of the Olympic Hotel at Seattle, Wash.

Table of Operating Statistics of Railways begins on next left-hand page



PREVENTION of WEAR *HERE*

Will Prolong the Life of Many Vital Parts

THE cost of locomotive running repairs depends in a large measure upon the quality of the wearing materials between the crossheads and guides.

Application of HUNT-SPILLER *Air Furnace* GUN IRON Crosshead Shoes will reduce frictional wear to a minimum and help your mechanical forces to keep out those disastrous crosshead pounds which affect the service life of many vital parts.

Guides, wrist pins, rod bearings, pistons and many other parts will wear longer and require less attention. Fewer units will be tied up for repairs — the savings in maintenance will surprise and please you. *Why not order some test installations before the fall traffic starts moving?*

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(Duplex Springs for Above Sectional Packing)
Cylinder Snap Rings
Valve Rings All Shapes

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Air Furnace

Operating Statistics of Large Steam Railways—Selected Items for the Month of June, 1933,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotives and tenders	Ton-miles (thousands): Net Revenue and non-revenue	Average number of locomotives on line: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany....1933	402	116,746	121,976	9,037	3,349	66.6	170,981	55,060	59	47	44.1	12
1932	402	105,640	109,886	6,959	2,897	67.8	145,773	46,716	71	48	40.2	27
Boston & Maine....1933	2,052	246,739	278,685	23,306	8,693	68.6	454,450	162,503	120	168	58.5	14
1932	2,057	249,981	281,443	22,595	7,858	66.2	415,978	144,091	143	143	49.9	32
N. Y., New H. & Hartf....1933	2,042	336,476	411,371	20,601	11,091	63.8	591,928	203,111	222	134	37.7	45
1932	2,056	325,215	381,741	19,924	9,805	64.2	515,067	172,799	208	137	39.7	9
Great Lakes Region:												
Delaware & Hudson....1933	848	192,480	255,352	29,870	6,446	61.9	393,612	171,208	254	26	9.2	161
1932	848	190,826	241,450	22,804	5,543	59.6	340,609	144,474	249	26	9.4	160
Del., Lack. & Western....1933	998	324,318	363,734	46,813	10,920	66.5	618,125	238,144	204	65	24.0	71
1932	998	297,151	324,443	38,041	9,044	66.0	502,381	183,612	211	56	21.0	69
Erie (incl. Chi. & Erie)...1933	2,316	646,316	673,843	52,341	26,852	62.2	1,649,115	600,400	290	211	42.1	71
1932	2,316	622,854	653,471	39,584	24,213	59.5	1,490,428	495,480	359	139	27.9	136
Grand Trunk Western....1933	1,003	202,861	204,677	1,901	5,420	60.6	324,103	107,840	78	75	49.2	12
1932	1,023	184,551	185,586	748	4,001	59.5	236,949	73,799	100	54	35.2	34
Lehigh Valley....1933	1,341	360,845	377,080	33,623	11,374	64.8	674,411	262,987	172	150	46.5	19
1932	1,343	310,608	321,691	26,341	9,453	62.9	556,997	207,532	201	149	42.7	60
Michigan Central....1933	1,957	356,197	356,933	9,590	11,674	60.0	690,277	217,225	134	53	28.3	37
1932	2,115	327,856	328,150	8,190	9,455	60.1	534,359	161,659	130	72	35.5	41
New York Central....1933	6,428	1,304,359	1,394,377	96,418	50,614	61.4	3,065,109	1,220,133	528	631	54.4	58
1932	6,437	1,253,845	1,315,410	74,886	43,357	59.7	2,620,348	985,904	623	677	52.1	108
New York, Chi. & St. L...1933	1,660	468,246	495,887	6,064	14,154	62.1	826,713	288,569	119	93	43.9	11
1932	1,660	412,682	433,759	6,202	12,194	61.8	696,731	221,256	145	89	38.1	46
Pere Marquette....1933	2,254	312,134	322,113	3,120	7,333	59.0	475,561	180,365	121	55	31.2	21
1932	2,243	267,202	270,394	2,701	5,572	58.1	355,869	128,069	140	38	21.5	37
Pitts. & Lake Erie....1933	231	69,751	72,133	1,446	2,755	55.8	238,208	129,826	30	40	57.3	..
1932	235	46,272	46,797	501	1,782	56.7	142,137	75,904	40	44	52.6	21
Wabash....1933	2,453	491,516	497,208	10,024	15,723	64.0	884,774	280,766	183	167	47.8	25
1932	2,497	502,818	513,574	10,081	14,494	62.9	815,617	246,592	218	152	41.1	46
Central Eastern Region:												
Baltimore & Ohio....1933	6,282	1,209,219	1,475,590	164,142	37,423	61.6	2,479,808	1,083,548	727	579	44.3	134
1932	6,277	1,171,869	1,326,474	127,169	31,357	60.0	2,001,706	809,213	861	475	35.6	299
Big Four Lines....1933	2,655	555,787	578,992	20,938	16,573	61.6	1,029,765	435,197	241	170	41.4	42
1932	2,688	506,949	523,159	11,338	13,767	60.9	840,972	344,656	245	162	39.8	52
Central of New Jersey....1933	692	127,466	143,696	24,140	4,170	57.9	281,111	125,711	111	67	37.5	58
1932	692	133,126	144,734	24,897	3,811	58.3	250,627	109,523	117	61	34.2	50
Chicago & Eastern Ill.....1933	939	166,776	167,395	2,489	3,285	64.3	196,679	77,182	56	106	65.4	20
1932	939	147,170	147,410	2,379	2,787	61.9	171,478	67,329	90	75	45.4	47
Elgin, Joliet & Eastern....1933	446	76,761	78,241	901	1,897	58.4	150,684	72,031	69	19	21.3	23
1932	447	55,217	55,495	959	1,243	57.1	92,576	42,485	82	8	8.7	40
Long Island....1933	396	25,761	26,408	11,380	265	52.0	19,599	7,359	30	17	36.7	3
1932	396	28,081	29,287	10,418	303	52.1	21,321	8,234	39	8	18.1	11
Pennsylvania System....1933	10,458	2,533,373	2,821,848	288,765	91,328	62.4	5,945,713	2,539,881	1,525	966	38.8	451
1932	10,536	2,333,205	2,579,377	246,363	78,332	61.2	5,029,023	2,034,138	2,095	434	17.2	1,045
Reading....1933	1,454	365,972	400,592	44,144	10,256	58.8	727,271	332,184	278	103	27.0	108
1932	1,453	336,372	358,357	31,704	8,592	58.5	588,314	259,396	295	100	25.3	135
Pocahontas Region:												
Chesapeake & Ohio....1933	3,144	764,145	804,654	35,035	34,593	56.5	2,865,983	1,536,282	522	170	24.6	233
1932	3,136	652,932	675,129	19,279	25,149	56.0	2,100,813	1,113,739	546	113	17.2	288
Norfolk & Western....1933	2,211	594,738	627,194	26,442	23,159	59.5	1,837,205	972,018	426	54	11.3	196
1932	2,258	469,695	484,796	19,827	16,210	60.5	1,277,053	660,848	435	54	11.1	228
Southern Region:												
Atlantic Coast Line....1933	5,144	554,786	557,459	7,494	11,224	62.0	592,578	195,709	376	123	24.6	104
1932	5,144	551,034	552,877	7,887	10,544	63.7	549,510	186,629	376	97	20.5	114
Central of Georgia....1933	1,904	203,326	204,990	3,518	4,857	70.0	252,554	92,203	95	45	32.4	..
1932	1,900	179,721	181,471	3,317	3,750	67.1	194,856	67,036	92	51	35.4	3
Ill. Cent. (incl. Y. & M. V.).1933	6,658	1,277,206	1,302,696	23,047	30,460	61.9	1,875,902	714,081	595	341	36.4	22
1932	6,658	1,181,598	1,195,373	19,740	27,329	60.3	1,696,488	627,376	739	209	22.0	73
Louisville & Nashville....1933	5,121	888,195	955,411	22,391	20,115	60.2	1,360,781	630,921	332	364	52.3	39
1932	5,263	804,461	845,734	17,387	16,362	60.0	1,075,649	470,824	450	263	36.8	179
Seaboard Air Line....1933	4,373	409,905	424,240	2,173	9,608	64.9	532,175	190,051	226	63	21.8	41
1932	4,437	400,484	408,456	4,393	7,917	60.8	445,237	145,096	252	36	12.5	63
Southern....1933	6,602	1,077,456	1,091,638	18,610	26,466	66.3	1,404,698	502,872	711	206	22.4	219
1932	6,669	939,278	946,029	15,824	19,879	65.9	1,055,127	370,485	726	226	23.8	242
Northwestern Region:												
Chi. & North Western....1933	8,443	894,631	946,380	22,405	23,344	64.1	1,397,924	478,549	571	242	29.7	190
1932	8,443	798,679	824,035	15,165	18,439	62.7	1,056,010	341,128	643	166	20.5	322
Chicago Great Western....1933	1,463	202,395	204,266	18,256	6,362	60.4	395,415	137,564	60	39	39.4	4
1932	1,448	175,075	175,155	12,288	5,535	59.6	334,855	115,017	64	49	43.6	6
Chi., Milw., St. P. & Pac..1933	11,234	1,130,636	1,209,234	67,502	30,587	60.8	1,920,486	756,126	667	223	25.1	290
1932	11,266	1,046,882	1,092,898	51,555	25,163	60.0	1,591,306	614,151	756	142	15.8	399
Chi., St. P., Minneap. & Om.....1933	1,681	211,867	220,961	9,092	4,507	67.0	270,328	120,495	126	32	20.0	56
1932	1,714	200,475	205,637	7,816	3,699	68.4	209,872	84,072	140	28	16.5	67
Great Northern....1933	8,424	542,070	546,513	14,375	17,286	66.6	1,087,164	486,382	460	153	24.9	162
1932	8,432	532,928	535,345	12,216	13,392	64.4	826,171	337,809	465	138	22.8	141
Minneap., St. P. & S. St. M.....1933	4,291	320,399	324,386	2,874	7,435	65.6	425,647	179,298	128	43	24.9	12
1932	4,325	324,122	326,655	1,755	6,109	65.7	335,637	129,239	141	56	28.4	17
Northern Pacific....1933	6,416	518,688	558,265	36,829	16,528	67.0	984,884	400,752	378	148	28.0	70
1932	6,397	508,831	536,675	33,432	13,217	63.9	805,769	277,659	387	132	25.3	118
Oreg.-Wash. R. R. & Nav..1933	2,185	135,737	141,522	11,330	3,473	70.6	186,111	70,413	81	39	32.6	21
1932	2,207	131,632	135,046	7,303	2,832	72.1	148,366	55,677	94	35	27.5	40
Central Western Region:												
Alton....1933	952	180,879	185,178	962	3,917	53.6	264,367	81,423	54	48	47.2	4
1932	990	191,762	193,311	959	3,824	52.6	260,702	78,243	87	25	21.9	23
Atch., Top. & S. Fe (incl. P. & St. F.)....1933	11,609	1,304,911	1,408,739	68,488	36,588	61.4	2,278,152	743,342	643	286	30.8	227
1932	11,599	1,208,531	1,286,101	54,324	32,214	61.0	1,983,367	646,686	722	192	21.0	314
Chi., Burl. & Quincy....1933	9,157	1,001,239	1,038,673	30,313	25,921	61.6	1,515,238	612,602	423	120	22.1	40
1932	9,210	881,479	907,376	26,539	21,284	62.2	1,160,908	459,835	475	141	23.0	86
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)....1933	8,333	1,004,040	1,027,841	5,928	22,626	58.7	1,403,520	499,968	454	161	26.1	97
1932	8,342	999,298	1,018,245	5,427	22,457	57.9	1,385,490	465,133	516	149	22.4	141
Denver & R. G. Wn....1933	2,514	173,789	188,931	18,192	5,299	68.8	298,403	118,550	198	43	17.9	59
1932	2,514	146,016	156,236	13,518	3,972	68.1	223,625	88,883	205	36	14.9	89
Los Angeles & Salt Lake..1933	1,239	131,498	144,977	14,929	3,700	70.7	206,826	77,536	75	33	30.3	15
1932	1,240	131,706	146,617	16,025	4,005	70.3	225,549	86,324	80	33	29.0	24
Oregon Short Line....1933	2,482	198,598	206,289	12,554	4,937	67.7	271,519	100,653	124	62	33.2	47
1932	2,471	180,540	182,932	5,655	4,232	69.3	228,872	82,879	148	35	19.1	81
Southern Pacific—Pacific Lines....1933	8,899	1,018,152	1,091,973	106,703	32,582	60.0	2,054,533	614,710	509	379	42.7	158
1932	8,911	1,064,311	1,135,892	98,647	32,102	59.7	2,012,319	584,727	552	372	40.3	168
Union Pacific....1933	3,768	730,300	755,114	37,098	26,160	65.3	1,641,140	523,649	342	118	25.6	156
1932	3,768	601,631	613,550	23,328	22,624	67.3	1,262,974	442,828	383	83	17.7	217
Southwestern Region:												
Gulf, Colo. & S. Fe....1933	1,943	175,286	177,978	3,053	4,669	61.4	296,330	116,493	93	33	26.2	25
1932	1,943	175,274	178,633	2,095	4,405	62.2	273,860	106,873	106	22	17.5	43
Mo.-Kans.-Texas Lines....1933	3,282	348,928	351,748	5,430	9,042	61.4	530,672	185,969	165	66	28.5	81
1932	3,282	345,128	347,629	5,142	8,849	56.7	547,378	185,010	165	63	27.6	82
Missouri Pacific....1933	7,384	1,025,729	1,056,133	22,826	29,080	63.4	1,760,313	669,035	416	160	27.8	145
1932	7,409	941,525	956,179	20,575	23,356	61.1	1,399,172	491,358	470	142	23.2	219
St. Louis-San Francisco...1933	5,193	608,432	614,017	7,451	13,664	60.1	847,048	324,776	389	80	17.1	144
1932	5,193	581,191	587,174	7,488	12,321	58.2	768,834	279,272	414	86	17.2	144
St. Louis Southwestern Lines....1933	1,872	240,623	252,661	3,313	6,365	57.2	393,189	116,460	102	28	21.8	20
1932	1,902	222,959	230,187	3,231	5,980	57.1	360,926	93,184	114	27	19.0	34
Texas & New Orleans....1933	4,472	454,803	454,983	7,370	9,933	58.9	611,267	196,498	216	95	30.5	53
1932	4,599	499,357	499,907	7,402	10,614	54.4	678,681	189,791	235	77	24.7	61
Texas & Pacific....1933	1,946	256,930	256,930	1,379	7,819	57.9	501,891	166,702	179	60	25.1	81
1932	1,946	264,113	264,113	1,322	7,082	58.3	441,062	131,516	167	79	32.3	48

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Compared with June, 1932, for Roads with Annual Operating Revenues Above $25,000,000

Region, road and year	Average number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
New England Region:													
Boston & Albany.....1933	4,402	3,369	7,771	37.1	23,115	1,465	472	16.4	236	21.6	4,568	148	41.4
1932	4,245	2,550	6,795	30.3	21,453	1,380	442	16.1	229	21.0	3,876	148	32.7
Boston & Maine.....1933	10,600	7,729	18,329	22.2	24,553	1,828	653	18.7	293	22.9	2,616	98	34.9
1932	11,326	6,154	17,480	14.8	22,663	1,642	568	18.3	271	22.3	2,300	102	35.4
N. Y., New H. & Hartf....1933	16,134	9,823	25,957	11.3	26,417	1,759	604	18.3	261	22.3	3,315	104	40.4
1932	16,221	9,165	25,386	8.1	23,500	1,584	531	17.6	227	20.1	2,802	107	38.8
Great Lakes Region:													
Delaware & Hudson.....1933	12,276	2,552	14,828	4.0	25,566	2,045	889	26.6	385	23.4	6,729	109	34.0
1932	12,973	2,326	15,299	3.2	24,434	1,785	757	26.1	315	20.3	5,678	114	32.1
Del., Lack. & Western.....1933	18,163	3,709	21,872	11.8	27,845	1,906	734	21.8	363	25.0	7,953	122	50.9
1932	20,318	3,216	23,534	7.4	24,802	1,691	618	20.3	260	19.4	6,132	124	45.3
Erie (incl. Chi. & Erie)...1933	34,021	11,307	45,328	6.4	40,586	2,552	929	22.4	442	31.8	8,641	90	48.3
1932	36,755	9,639	46,394	4.5	38,832	2,393	795	20.5	356	29.2	7,131	93	46.4
Grand Trunk Western.....1933	5,308	8,005	13,313	20.0	28,649	1,598	532	19.9	270	22.4	3,585	90	45.1
1932	4,883	6,899	11,782	12.2	24,307	1,284	400	18.4	209	19.0	2,404	99	40.3
Lehigh Valley.....1933	18,556	4,578	23,134	22.6	32,055	1,869	729	23.1	379	25.3	6,538	127	42.5
1932	23,405	3,763	27,168	14.2	30,457	1,793	668	22.0	255	18.5	5,150	108	33.1
Michigan Central.....1933	26,002	17,713	43,715	12.3	35,317	1,938	610	18.6	166	14.8	3,700	106	65.4
1932	25,057	15,721	40,778	6.4	30,434	1,630	493	17.1	132	12.9	2,548	109	55.6
New York Central.....1933	77,485	60,106	137,591	27.2	36,667	2,350	935	24.1	296	20.0	6,327	92	42.9
1932	77,118	66,992	144,110	15.5	33,176	2,090	786	22.7	228	16.8	5,105	96	35.7
New York, Chi. & St. L...1933	10,717	6,431	17,148	8.1	32,107	1,766	616	20.4	561	44.3	5,794	93	78.7
1932	16,192	5,372	21,564	12.7	30,034	1,688	536	18.1	342	30.5	4,442	90	62.8
Pere Marquette.....1933	12,599	4,184	16,783	2.9	25,565	1,524	578	24.6	358	24.7	2,667	83	61.7
1932	14,124	3,185	17,309	3.2	22,124	1,332	479	23.0	247	18.5	1,903	86	51.1
Pitts. & Lake Erie.....1933	17,165	8,923	26,088	30.8	46,836	3,415	1,861	47.1	166	6.3	18,719	90	34.9
1932	18,244	6,103	24,347	28.0	39,362	3,072	1,640	42.6	104	4.3	10,758	108	18.7
Wabash 1933	16,672	8,334	25,006	4.9	36,484	1,800	571	17.9	374	32.7	3,815	95	48.3
1932	19,561	7,158	26,719	7.9	33,582	1,622	490	17.0	308	28.7	3,292	97	47.2
Central Eastern Region:													
Baltimore & Ohio.....1933	92,495	18,494	110,989	20.8	26,560	2,051	896	29.0	325	18.3	5,749	137	41.9
1932	99,221	13,716	112,937	11.7	23,486	1,708	691	25.8	239	15.4	4,297	140	36.3
Big Four Lines.....1933	19,693	19,881	39,574	19.1	32,608	1,853	783	26.3	367	22.7	5,464	108	48.7
1932	23,603	16,817	40,420	14.3	30,090	1,659	680	25.0	284	18.7	4,275	106	43.8
Central of New Jersey....1933	17,461	5,570	23,031	29.0	26,206	2,205	986	30.1	182	10.4	6,056	124	31.4
1932	18,621	5,140	23,761	21.2	24,148	1,883	823	28.7	154	9.2	5,274	142	31.8
Chicago & Eastern Ill.....1933	6,179	2,216	8,395	18.7	22,319	1,179	463	23.5	306	20.3	2,740	121	34.9
1932	6,311	1,616	7,927	14.7	20,775	1,165	457	24.2	283	18.9	2,390	129	30.4
Elgin, Joliet & Eastern....1933	9,497	3,565	13,062	24.8	17,009	1,963	938	38.0	184	8.3	5,383	108	30.0
1932	9,708	3,354	13,062	9.8	14,730	1,677	769	34.2	108	5.6	3,168	125	20.9
Long Island 1933	788	3,496	4,284	1.8	5,671	761	286	27.8	57	4.0	619	277	26.6
1932	789	3,514	4,303	.7	5,409	759	293	27.2	64	4.5	693	350	28.2
Pennsylvania System 1933	248,893	51,451	300,344	11.3	33,023	2,347	1,003	27.8	282	16.2	8,096	114	41.6
1932	252,231	47,011	299,242	7.0	31,226	2,155	872	26.0	227	14.3	6,436	121	37.2
Reading 1933	38,146	7,153	45,299	23.7	23,489	1,987	908	32.4	244	12.8	7,617	142	39.0
1932	40,232	6,423	46,655	8.3	21,828	1,749	771	30.2	185	10.5	5,949	136	32.9
Pocahontas Region:													
Chesapeake & Ohio.....1933	47,193	9,709	56,902	1.9	52,632	3,751	2,010	44.4	900	35.9	16,288	68	40.5
1932	49,644	6,769	56,413	2.4	45,689	3,218	1,706	44.3	658	26.5	11,839	72	35.1
Norfolk & Western.....1933	38,763	4,571	43,334	3.5	47,353	3,089	1,634	42.0	748	29.9	14,654	100	45.4
1932	42,511	3,445	45,956	3.2	41,322	2,719	1,407	40.8	479	19.4	9,755	107	34.3
Southern Region:													
Atlantic Coast Line.....1933	26,553	4,558	31,111	25.6	19,669	1,068	353	17.4	210	19.4	1,268	114	37.8
1932	27,320	4,484	31,804	9.4	17,433	997	339	17.7	196	17.3	1,209	113	39.5
Central of Georgia.....1933	7,131	2,815	9,946	23.1	21,558	1,242	453	19.0	309	23.2	1,615	121	49.6
1932	7,920	1,728	9,648	20.3	19,969	1,084	373	17.9	232	19.3	1,176	127	43.1
Ill. Cent. (incl. Y. & M. V.).1933	53,981	12,851	66,832	29.6	25,606	1,469	559	23.4	356	24.6	3,575	126	47.2
1932	55,615	10,892	66,507	17.9	24,044	1,436	531	23.0	314	22.7	3,141	123	42.7
Louisville & Nashville.....1933	53,002	7,778	60,780	25.6	22,767	1,532	710	31.4	346	18.3	4,107	130	46.8
1932	55,674	6,513	62,187	17.5	20,691	1,337	585	28.8	252	14.6	2,982	139	40.4
Seaboard Air Line.....1933	12,509	4,092	16,601	8.3	20,986	1,298	464	19.8	382	29.7	1,449	118	49.1
1932	15,387	3,359	18,746	8.3	18,000	1,112	362	18.3	258	23.2	1,090	126	47.9
Southern 1933	32,462	17,828	50,290	20.7	21,715	1,304	467	19.0	333	26.4	2,539	137	40.4
1932	42,190	22,472	64,662	14.4	18,972	1,123	394	18.6	191	15.6	1,852	145	33.7
Northwestern Region:													
Chi. & North Western....1933	44,822	16,667	61,489	11.0	23,601	1,563	535	20.5	259	19.7	1,889	110	39.7
1932	46,173	15,165	61,338	7.5	19,648	1,322	427	18.5	185	16.0	1,347	122	34.6
Chicago Great Western....1933	4,144	2,769	6,913	12.9	34,079	1,954	680	21.6	663	50.8	3,134	117	75.2
1932	5,189	2,789	7,978	12.3	32,272	1,913	657	20.8	481	38.8	2,648	120	55.4
Chi., Milw., St. P. & Pac..1933	59,938	13,244	73,182	4.8	26,017	1,699	669	24.7	344	22.9	2,243	111	47.8
1932	65,258	10,992	76,250	3.8	23,027	1,520	587	24.4	268	18.3	1,817	114	42.5
Chi., St. P., Minneap. & Om. 1933	2,137	6,422	8,559	10.4	18,363	1,276	569	26.7	469	26.2	2,390	101	48.5
1932	2,471	7,447	9,918	7.8	15,033	1,047	419	22.7	283	18.2	1,635	113	42.3
Great Northern.....1933	43,519	7,644	51,163	8.2	29,996	2,006	897	28.1	317	16.9	1,925	107	30.5
1932	44,983	5,976	50,959	7.3	23,605	1,550	634	25.2	221	13.6	1,335	122	30.3
Minneap., St. P. & S. St. M. 1933	19,114	2,718	21,832	4.8	20,575	1,328	560	24.1	274	17.3	1,393	89	63.8
1932	21,086	2,679	23,765	3.8	16,534	1,036	399	21.2	182	13.1	996	103	55.6
Northern Pacific.....1933	42,613	3,700	46,313	12.1	29,749	1,899	773	24.2	288	17.8	2,082	131	37.7
1932	43,733	3,396	47,129	10.3	25,409	1,584	546	21.0	196	14.6	1,447	136	36.6
Oreg.-Wash. R. R. & Nav..1933	7,891	2,476	10,367	7.7	22,348	1,371	519	20.3	226	15.8	1,074	147	42.6
1932	9,763	1,481	11,244	15.5	19,060	1,127	423	19.7	165	11.6	841	152	36.7
Central Western Region:													
Alton 1933	3,409	5,422	8,831	17.5	28,223	1,462	450	20.8	307	27.6	2,852	105	60.8
1932	5,285	4,322	9,607	12.9	27,933	1,360	408	20.5	271	25.2	2,634	104	58.0
Atch., Top. & S. Fe (incl. P. & S. F.).....1933	67,219	7,909	75,128	12.4	32,113	1,746	570	20.3	330	26.4	2,134	103	53.0
1932	72,396	8,231	80,627	10.6	29,717	1,641	535	20.1	267	21.8	1,858	102	48.9
Chi., Burl. & Quincy.....1933	40,944	11,737	52,681	10.0	25,409	1,513	612	23.6	388	26.6	2,230	112	65.6
1932	47,293	9,927	57,220	7.5	21,786	1,317	522	21.6	268	19.9	1,664	110	50.5
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)....1933	38,882	10,760	49,642	20.0	23,427	1,398	498	22.1	336	25.9	2,000	126	56.0
1932	43,001	9,943	52,944	15.4	23,548	1,386	465	20.7	293	24.4	1,859	125	51.4
Denver & R. G. Wn.....1933	14,247	2,539	16,786	4.2	26,813	1,717	682	22.4	235	15.3	1,572	157	28.7
1932	14,596	2,278	16,874	3.3	23,404	1,532	609	22.4	176	11.5	1,179	155	23.5
Los Angeles & Salt Lake..1933	4,257	864	5,121	8.3	27,829	1,573	590	21.0	505	34.1	2,085	128	49.4
1932	4,564	983	5,547	5.6	28,995	1,713	655	21.6	519	34.2	2,321	135	48.1
Oregon Short Line.....1933	10,471	2,451	12,922	17.6	23,608	1,367	507	20.4	260	18.8	1,352	120	39.3
1932	9,765	1,910	11,675	9.3	22,094	1,268	459	19.6	237	17.4	1,118	116	34.4
Southern Pacific—Pacific Lines 1933	39,653	21,916	61,569	14.6	32,271	2,018	604	18.9	333	29.4	2,303	103	45.0
1932	44,735	22,448	67,183	13.1	29,971	1,891	549	18.2	290	26.7	2,187	104	44.6
Union Pacific.....1933	25,299	6,717	32,016	21.5	48,423	2,247	717	20.0	545	41.7	4,633	98	57.5
1932	25,240	6,139	31,379	16.6	42,067	2,099	736	19.6	470	35.7	3,917	100	45.6
Southwestern Region:													
Gulf, Colo. & S. Fe.....1933	12,545	1,427	13,972	7.5	27,935	1,691	665	25.0	278	18.2	1,998	98	48.0
1932	9,922	2,244	12,166	6.7	25,257	1,562	610	24.3	293	19.4	1,833	101	47.2
Mo.-Kans.-Texas Lines.....1933	10,242	2,409	12,651	7.5	27,101	1,521	533	20.6	490	38.8	1,889	84	51.7
1932	12,475	2,654	15,129	4.0	27,659	1,586	536	20.9	408	34.4	1,879	84	51.7
Missouri Pacific.....1933	25,990	17,065	43,055	14.2	29,797	1,716	652	23.0	518	35.5	3,020	115	62.4
1932	32,145	10,108	42,253	12.7	26,444	1,486	522	21.0	388	30.2	2,211	118	53.2
St. Louis-San Francisco...1933	24,995	4,982	29,977	7.2	23,433	1,392	534	23.8	361	25.3	2,085	124	44.2
1932	29,690	5,166	34,856	5.1	22,232	1,323	481	22.7	267	20.2	1,793	121	39.7
St. Louis Southwestern Lines 1933	4,618	3,568	8,186	9.9	29,539	1,634	484	18.3	474	45.3	2,073	81	65.4
1932	5,969	2,951	8,920	10.6	30,030	1,619	418	15.6	348	39.1	1,633	89	55.4
Texas & New Orleans.....1933	8,861	11,208	20,069	7.5	23,078	1,344	432	19.8	326	28.0	1,465	87	49.6
1932	13,235	12,444	25,679	7.9	22,922	1,359	380	17.9	246	25.3	1,376	89	54.2
Texas & Pacific.....1933	4,473	5,112	9,585	6.8	30,102	1,953	649	21.3	580	47.0	2,856	78	36.1
1932	6,080	3,727	9,807	13.2	26,925	1,670	498	18.6	447	41.3	2,253	84	36.0

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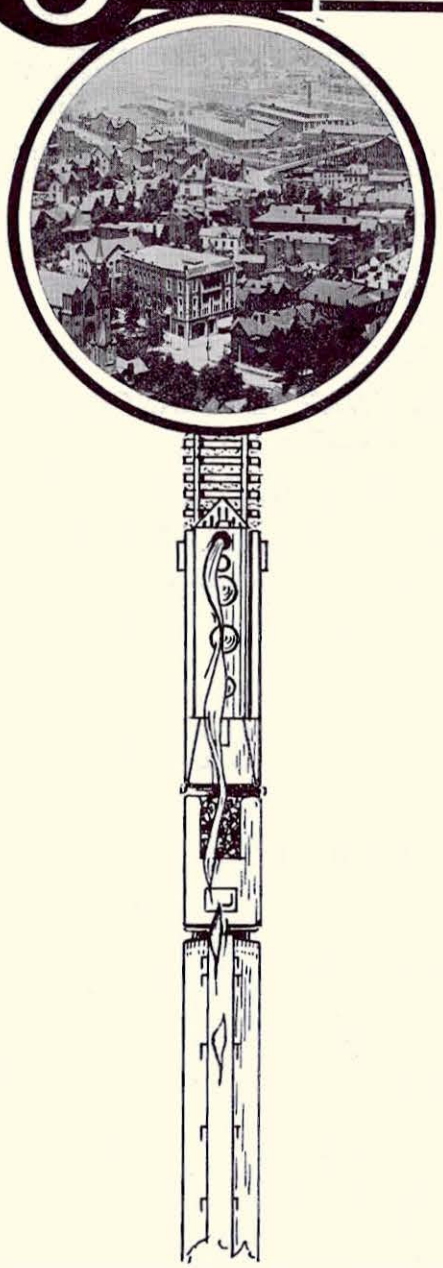

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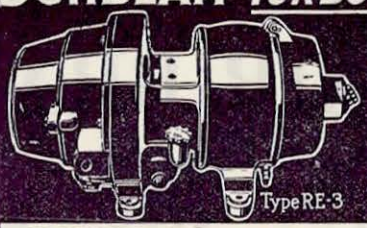

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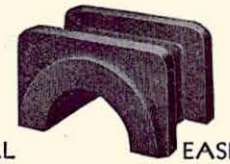
FLEXIBLE CONDUITS in place of Steam Hose

CONTROLS for Air Conditioning

VAPOR CAR HEATING CO., Inc.
RAILWAY EXCHANGE, CHICAGO

"TIGER" BRONZE
ENGINE CASTINGS

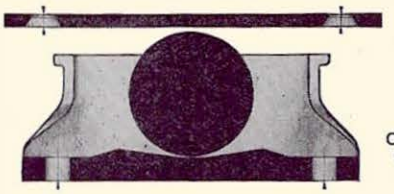
STRONG  TOUGH

ANTI-FRICTIONAL EASILY MACHINED

NATIONAL BEARING METALS CORP.
ST. LOUIS, MO.

New York, N. Y. Jersey City, N. J. Pittsburgh, Pa. Meadville, Pa. Portsmouth, Va. St. Paul, Minn.
3

Pittsburgh Spring & Steel Co.
1417 Farmers Bank Building, Pittsburgh, Pa.
Makers of Elliptic and Spiral SPRINGS of Every Description
Carbon, Vanadium, Silico-Manganese Steels.
Licensed manufacturers under patents for Symington Coil-Elliptic groupings.
Washington, D. C. 324 Union Trust Bldg. New York 2038 Grand Central Terminal Chicago 1411 Fisher Bldg.



STUCKI SIDE BEARINGS
Manufactured by A. Stucki Co.
Oliver Bldg., Pittsburgh, Pa.
Canadian Representative: The Holden Co., Ltd., Montreal, Can.

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EDGEWATER STEEL COMPANY
PITTSBURGH, PA.

Details of our products appeared in the following issues of Railway Age during 1931, 1932 & 1933:
1931—May 16—June 13—July 4—Aug. 1, 8, 15, 22, 29—Sept. 5, 12—Oct. 3—Dec. 5.
1932—Jan. 2—March 5—April 2—May 7—June 18, 25—Sept. 3.
1933—Feb'y 4, 25—March 4—April 1—May 6—June 3, 24—July 1, 22.

GET TOGETHER DEPARTMENT

Non-Display "Employment" Ads five cents a word. Count address in figuring cost. Box number requires ten words. All other classified Ads $4.00 an inch (1" x 1⅝") an insertion. Payable in advance. Railway Age, 30 Church St., New York, N. Y.

Your classified advertisement should appear in this section.

POSITION OPEN

SALARIED POSITIONS $2,500 to $25,000—This thoroughly organized advertising service of 23 years' recognized standing and reputation carries on preliminary negotiations for positions of the caliber indicated, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If you have actually earned over $2,500, send only name and address for details.
R. W. BIXBY, Inc.
102 Delward Bldg., Buffalo, N. Y.

EDUCATIONAL

THE Railway Educational Bureau, Omaha, Neb., offers a distinctive education service for Supervisors and other employes. Write for FREE Special Bulletin.

Have You Changed Your Address?

Notice of change of address of subscribers should reach the office of Railway Age, 30 Church St., New York, ten days in advance to insure delivery of the following issue to new address. In sending notification of change always include the old address as well as the new.

Name..... Old Address .....

New Address.....

..... Position..... Company.....

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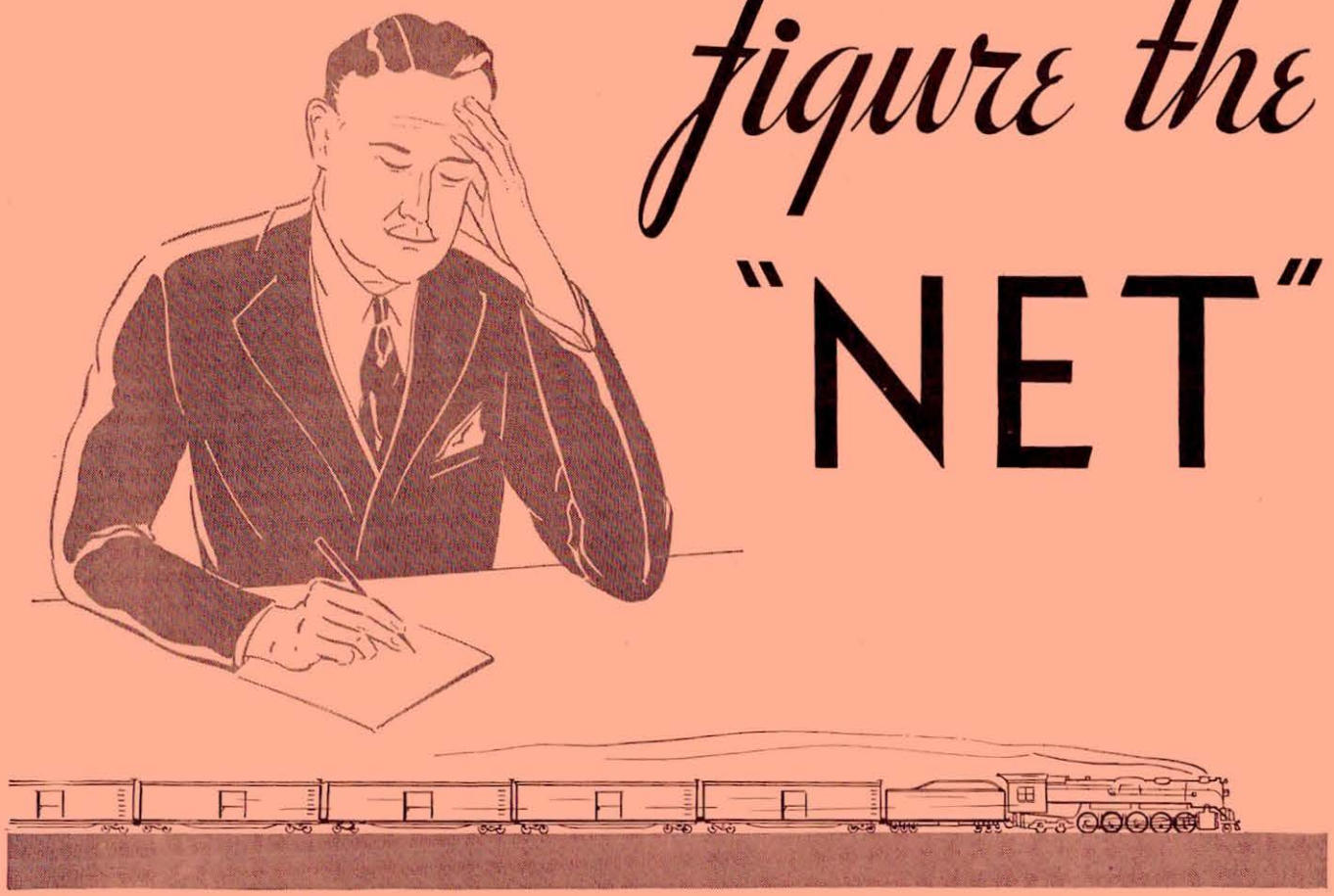


To be merely able to start a heavy train is not enough — it may even be a handicap.

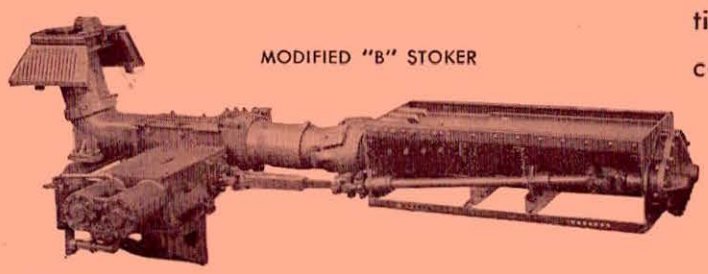
To move that train fast enough to show satisfactory earning capacity is an entirely different matter.

Sustained steaming capacity is the factor that counts most in locomotive operation; in operating costs; in locomotive earnings.

Dependable Stoker firing maintains full potential steaming capacity at all times and under all conditions of service.

It provides that extra certainty of full boiler pressure that gets the train over the road at the most economical speeds — that returns the greatest net from train movement.

DEPENDABLE STOKERS



MODIFIED "B" STOKER

THE STANDARD STOKER COMPANY, INC.

NEW YORK CHICAGO ERIE

MODERN RAILWAY SIGNAL INSTALLATIONS ARE SELF-LIQUIDATING PROJECTS

CENTRALIZED TRAFFIC CONTROL

"Centralized traffic control for single or multiple track operation is recommended as an economic means to be considered for postponing capital expenditure for additional trackage and reducing operating expenses by relieving congestion, increasing track capacity, improving train operation, eliminating written train orders and providing facilities for instantly directing train movements as required.

"This system of train operation is considered by many to be among the outstanding recent developments in the railway field and its wide use as a means of handling trains is predicted because of the economies in operation which it affords."*

Centralized Traffic Control Installations as Self-Liquidating Projects

	Case A	*Case B*	*Case C*
Miles of track	20.0	43.5	29.0
Trains per day, average	28	34	30
Saving per freight train miles, mins.	.6	1.8	1.7
Annual Return On Investment over and above 6% interest charges	22%	24%	28%

✣ ✣ ✣

Centralized Traffic Control—A system of railroad operation by means of which the movement of trains over routes and through blocks on a designated section of road is directed by roadside or locomotive cab signals or both, controlled from a central office or interlocking station without requiring the use of train orders and without superiority of trains.

*Excerpts from Committee Report to the ARA Signal Section, published in ARA SS Proceedings, May, 1933, pp. 150-160.

UNION SWITCH & SIGNAL COMPANY
Swissvale, Pennsylvania

GENERAL RAILWAY SIGNAL COMPANY
Rochester, N. Y.

95

Signals Aid Modern Motive Power to Produce More Ton-Miles Per Train-Hour